THE UTILISATION AND MANAGEMENT OF THE SEMI-NATURAL WOODLANDS OF LOCHTAYSIDE, 1650-1850

Mairi J. Stewart

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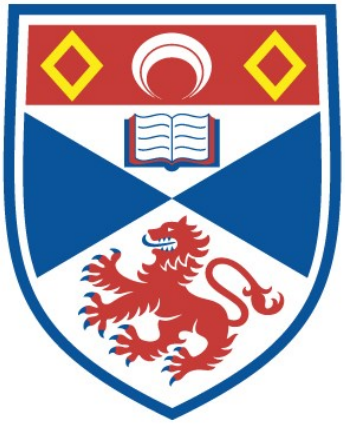

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Mairi J Stewart

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ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 – 1346

Abstract

There has been in Scotland, in recent years, a resurgence in interest the past history of our woodland, and their future management. The work of Lindsay in the 1970's did much to scotch earlier misconceptions about the utilisation and management of Highland woodlands (Lindsay 1974). Rather than being wholly exploitative, commercial influences during the 18th and 19th centuries may, in fact, have helped temper further woodland decline. It is now generally recognised that non-commercial influences may have been more significant in the evolution of woodlands in the historic period. It is now generally recognised that an understanding of past influences can contribute to future management strategies. This thesis therefore set out to examine the utilisation and management of the semi-natural woodlands of Lochtayside, and in particular, the commercial and non-commercial uses of the woodlands, and their subsequent management. It is hoped that results of this study would both suppliment our existing understanding of Scottish woodland history, and be taken into consideration in the debate on future management strategies. Initially, the study provides a context for the processes of woodland utilistion and management. Thus, the principal decision-makers involved in the determination of woodland policies on Lochtayside were examined -the Campbells of Glenorchy. Both internal and external factors which might affect their decisions were also investigated. A critical evaluation of the sources for a woodland history study followed. Sources included, contemporary published works relating to the Highland rural society and the economy; the primary documentary source, i.e., the Breadalbane muniments; and cartographic sources, primarily, the Pont Map, the Roy Map, both the Fair and the Protracted versions, the 1769 Survey of Lochtayside and the 1st edition Ordnance Survey. A critical assessment of the advantages and disadvantages is regarded as fundamental to woodland history, and the study explored the limitations of using such sources, in particular the cartographic evidence. Finally, the non-commercial use of the produce and area of the semi-natural woodlands on Lochtayside, and the commercial use of these woodlands, including for bark, timber and charcoal was examined. Conclusions reached suggest there was a complex relationship between these two forms of use which affected the management of the woodlands, and ultimately the extent and composition of the woodlands on Lochtayside. It became clear that the relationship between the agriculture and woodlands was critical. The precise nature of this relationship, however, requires further examination.

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I, Mairi J Stewart, hereby certify that this thesis, which is approximately 40,000 words in length, has been written by me, that it is the record of work carried out by me and that it has not been submitted in any previous application for a higher degree.

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I was admitted as a research student in September 1995 and as a candidate for the degree of M.Phil. in September 1995; the higher study for which this is a record was carried out in the University of St Andrews between September 1995 and December 1996.

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Contents

INTRODUCTION

There is a general acceptance among those people interested in woodlands that there is a dearth of knowledge about the history of the woodlands of the Scottish Highlands (FC 1995a). This is now increasingly becoming regarded as an important shortcoming with regard to the understanding of woodlands today. Both foresters, conservationists and historians are becoming increasingly aware that in order to effectively devise strategies for the protection and conservation of semi-natural woodlands, there is a need to have an intimate knowledge of the landscape of which they are a part, and its history, beyond assumption and generalisation (Cheape 1993).

In the past, attention has often focused on the prehistoric period in Scotland, in particular the composition and extent of primeval forests, and the causes of its decline. Meanwhile, woodland history studies of the historic period, at least until the more recent research of the last 20 years, have tended to be generalised, lacking detail and rigorous analysis of the available evidence. Published accounts of woodland history have been repeatedly utilised as basic sources for later work, thus perpetuating earlier misinterpretation (Darling 1949; Nairne 1890-1; Anderson 1967). This situation can partly be attributed to a paucity of detailed early records, particularly for the medieval period, but also for the early modern period. While this may be true for the aforementioned period, such a belief, that there is a lack of sources for the late modern period, is perhaps a misconception, and more a problem of accessibility. There is, indeed, a wealth of documentary sources which could have been utilised to uncover the history of Scotland's woodland, particularly from the 17th century onwards. These sources, until recently, have been grossly under-utilised.

Thus, until Lindsay's ground-breaking research of the mid-1970's, it was generally assumed that the destruction of the primeval forests, which once covered between 50 and 60 percent of the land area (Smout 1993), was the work 'of saws and sassanachs' (Nairne 1890-1; Darling 1949; Anderson 1967). In particular, woodland clearance was regarded as a response to strategic requirements or commercial exploitation, the former often associated with the Romans, the latter usually involving English or Irish entrepreneurs (Lindsay 1974; Dickson 1992;

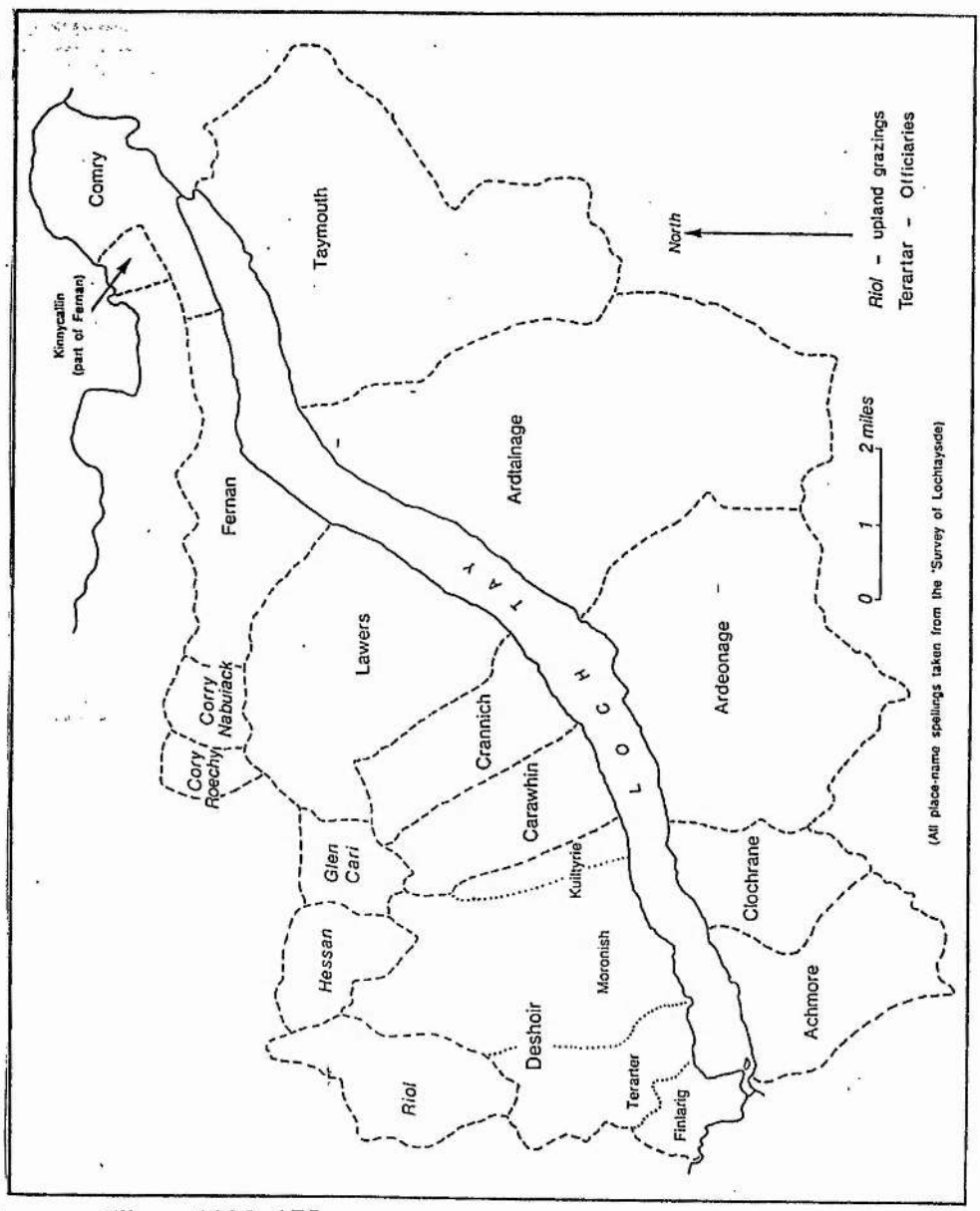
Smout 1993). Current thinking discounts this as myth; rather, research has established that the woodland area had considerably declined and fragmented before man arrived in the region (Lindsay 1974; Tipping 1993; Dickson 1992).

Conventional wisdom, largely based on the seminal work of Lindsay, now suggests that the combined actions of environmental and anthropological factors had reduced the woodland of the Highlands very considerably by the 17th century (Smout 1993). Prominent among the anthropogenic pressures was the effects of grazing animals, although clearance for cultivation, the effects of fire and local exploitation of woodland produce, may also have been important, while climate change and the associated formation of blanket peat was the principle environmental factor (Lindsay 1974, 18-19; Peterkin 1993, 30-1).

The late modern period in Scotland has been described as being the "heyday for woodmanship" (Rackham 1980, 285). Rackham describes 'woodmanship' as the art of getting produce from a wood without destroying the existing vegetation (ibid., 3). Strictly speaking, in Scotland at least, where wood pasture was not common, Rackham seems to be referring to the adoption of a coppice management regime, of a form which came to Scotland much later than other parts of the British Isles, particularly the south of England. In theory, by adopting such a sustainable system of woodland management, exploitation is avoided, and the woodland area will remain constant. In practical terms, 'woodmanship' may well have been practised in Scotland earlier than is generally accepted, albeit in a more crude form (Dickson, 1992, 158).

Consequently, it might be suggested, that if sustainable woodland management practices were being adopted in Scotland during the 17th, 18th and 19th centuries, but the woodland area was still declining, other landuses must have been adversely affecting woodland condition and extent. Lindsay highlighted this possibility, and in doing so moved the argument for the decline of Highland woodlands away from external influences such as invaders, English ironmasters and 'woodmanship' (Lindsay 1974, 14). He sought other causes for woodland decline, and placed the emphasis on the role of the indigenous agricultural producer, in particular, the pressures of a pastoral system in which "pastoralists

Figure 1: The Administrative Division of Lochtayside, 1769



Source: Gibson 1990, 175

aim to maximise production rather than to achieve equilibrium with existing resources" (Lindsay 1974, 14).

A feature of the woodland history debate has therefore centred on the relative importance of commercial exploitation *versus* domestic utilisation by the indigenous population, during the historic period. Again, until comparatively recently, woodland historians have tended to blame commercial utilisation for the continuing decline of woodlands, and overlooked traditions of sustainable management primarily through fencing and coppicing. A number of case studies, largely based on documentary evidence, have redressed this situation, and explored the role of commercial factors in the late historic period, emphasising that commercial utilisation was often accompanied by sustainable management based on the adoption of a coppice system, at least in the case of deciduous woodlands (Tittensor 1970; Lyndsay 1974; Rymer 1980. Thus it appears that coppicing was extensively practised in many of the oakwoods of Argyll, particularly along Loch Awe and in south-west Perthshire and Dunbartonshire, particularly east of Loch Lomond during the 18th and 19th centuries for commercial charcoal and tanbark production. Even some Caledonian pinewoods appear to have been sustainably managed on a commercial basis, such as the Blackwood of Rannoch during the 18th century (Lindsay 1974). By the 1750's, it has been argued, the location and extent of woodland had broadly-speaking changed very little, and 100 years later, despite more intensive commercial exploitation, the woodland area had remained relatively constant (Lindsay 1974, 20-34; Walker & Kirby 1989). The role of non-commercial utilisation is therefore currently regarded as more significant in the continued decline of Highland woodlands during the late historic period.

It was with this debate in mind that it was decided to undertake a documentary-based case study which would examine the utilisation and management of woodlands on Lochtayside in highland Perthshire during the period when commercial influences became more important in the Highlands.

By focusing down on one very distinctive geographical area where woodland is a key component of the landscape, both past and present, it is anticipated that an understanding can be gained of the influences and trends in woodland utilisation.

The benefits should be two-fold. Through discovering the history of these woods during the period of greatest commercial pressures, it is hoped that any future strategies for the conservation and management of the existing woodlands of Lochtayside will be better informed and sensitive to their past composition and management. To this end, Highland Perthshire Native Woodlands, an area-based initiative of Scottish Native Woods who are sponsoring this research, and whose primary role is to encourage appropriate management of native woodland remnants, will utilise the information gained from this study when approaching the management of Lochtayside's woods. Secondly, it is hoped that the results of this study will further enhance our knowledge of Highland woodland history, and stimulate continued debate.

It is important to point out at this stage that it is the intention of this study to examine in detail only those woods on Lochtayside which can be regarded as semi-natural. That is, "those woods which are composed predominantly of species native to the site, which have not obviously been planted but rather have originated from self-sown seed or stump regrowth" (Roberts et al. 1992, 168).

While planting has been a feature of woodland enhancement on the Breadalbane estates, at least since the 16th century, plantations, their origins and composition, will not be looked at in detail. Furthermore, the history of Caledonian pinewoods, which although there is evidence for their presence near Killin at the west end of Loch Tay, will not be examined. Rather, it is intention of this study to concentrate on the deciduous coppice woodlands of Lochtayside, which made up the majority of the woodland resource of the district during the period of study, 1650-1850.

No matter how clearly targeted any woodland history research is, there always remains the problem of the definition of a 'wood'. It will be seen that throughout this work, reference is made to individuals and organisations, all of whom apply their own ideas of what constitutes a 'wood'; these rarely coincide. Each person's definition is usually heavily dependant upon their primary objectives. Consequently the late 18th century agricultural improver is liable to regard woodland as 'waste', i.e. not fit to be cultivated His eye regards scattered trees, or scrub, as potentially utilisable pasture, or even arable ground. At the other

extreme, a 20th century botanical surveyor is likely to regard the merest scattering of trees along a hillside as a woodland, if it continues to support a woodland flora. Examples of the whole spectrum in between these extremes can be found in the sources for woodland history, particularly the cartographic sources. It was not until the production of the First edition Ordnance Survey in the mid 19th century, that a serious attempt was made to universally define vegetation, and to differentiate vegetation type from land use. Even then, definitions were not clear-cut, and were revised and simplified for later editions (Harley 1975).

As a result of the inconsistencies of definition of woodland within the documentary sources utilised for this study, an element of subjective interpretation on the part of the researcher is regarded as being unavoidable. From time to time, throughout the succeeding chapters, this problem will be highlighted, particularly in Chapter Two. Given the similarity in approach between this study and that of Lindsay's, i.e. being largely documentary based using case studies, it was decided to adopt the ecologically based definition used by Lindsay. That is, "woodlands may be described as all communities of vegetation in which tree species are dominant, ...[however]...scattered trees do not constitute the dominant species of woodland communities, and woodland communities do not consist only of trees" (Lindsay 1974, 2-3, based on Tivy 1971).

Loch Tay lies at the heart of the district long known as Breadalbane, which roughly equates with the upper catchment of the River Tay, from where it meets the River Lyon in the east, to its headwaters near Tyndrum. Within this district, the woodlands are largely concentrated along the valley, river and loch sides, with Lochtayside itself supporting some of the finest examples of native woodlands in Perthshire (See Figures 9 & 10). This area was once part of the Breadalbane estate, a vast Campbell stronghold extending from Lismore in the west, to Aberfeldy in the east.

The Breadalbane Muniments, the bulk of which are housed in the Scottish Record Office, Edinburgh, contain documents relating to the Campbells of Glenorchy spanning some 500 years, from 1374 until the 1920's. This collection has been described as, arguably, one of the finest for estate papers in Scotland, and is inordinately prodigious in 16th, 17th and 18th century material (Bil, 1996; 3). It

is therefore the intention of this study to look at the historical development of the woodland of Lochtayside, by utilising primarily these records, but also by examining the cartographic record for the district, and other printed sources.

The Earls of Breadalbane were among a group of landowners, including the Dukes of Atholl, who in the late 18th and 19th centuries were leading the way in the development of forestry. They are therefore regarded as being eminently suitable as a focus for the study of woodland history. Chapter One will therefore provide a brief history of these Campbell magnates, who were without doubt the most influential decision-makers with regard to the Lochtayside woodlands. This will involve sub-sections based on the succession of the Earls, briefly describing the times they were living in, and their areas of interest. This will incorporate a preliminary discussion of the background influences which shaped the Highland landscape during the study period, and the responses of those in control of estate management to these wider economic, social and political pressures.

Any piece of historical research critically relies upon the value of its sources. As already noted, there is always a danger in relying on secondary sources, while the nature of primary sources equally puts some obstacles in the way of gleaning an unbiased picture of the important event, relationships and processes associated with estate and woodland management. It was therefore regarded as being particularly important for this study to critically examine its sources, and Chapter Two sets out to do this. Much has already been written about 18th and 19th century contemporary sources, which are often used to illustrate the Highland way of life (Whyte 1979; Bil 1990; Smout 1969; OSA 1976). A brief review of these will be made in relation to their value for a local woodland history study. Equally it is important to be aware of the pitfalls of using estate records, and these will be assessed both at a general level, and specifically at the level of the individual muniment.

The Lochtayside district is fortunate in having a particularly fine series of historic maps and plans available, which are uniquely placed to provide a visual representation of the development of its landscape over the past 400 years. It would be easy, however, to fall into the trap of accepting, at face value, the landscape that these maps and plans depict; a trap which, all too often, historical

geographers and others have fallen into (Lindsay 1975b; Cheape 1993; Anderson 1967; Walker & Kirby 1989). Particular emphasis will therefore be placed on a critical examination of these cartographic sources. It is anticipated that this will enable the subsequent examination of the use of the Lochtayside woodlands during the study period, to be based on a more accurate level of knowledge, with regard to their composition, extent and distribution.

Chapter Three will attempt to pull together all the available evidence for the utilisation of the Lochtayside woodlands, and evaluate the relative importance of commercial and non-commercial factors and the role these factors played in the changing nature of the woodlands. Firstly, non-commercial utilisation, both of the woodland area and its produce, will be examined. This can simply be defined as domestic use, and while it may be argued that the use of the woodland area for pasturing black cattle, and particularly 19th century Lowland sheep flocks, could be regarded as commercial utilisation, for the purposes of this study, only the sale to external markets of the primary resource of woodland, i.e. trees, will be regarded as commercial utilisation. Thus the use of the woodland area, primarily for grazing, but also for game rearing, will be discussed in the first section of this chapter, as well as domestic usage of wood products. Furthermore, an examination of ownership and control of the woodland resource during the study period will be made. The nature of this utilisation will be examined, and in particular, whether it can be regarded as purely exploitative, and what effect it had on the character of the semi-natural woodlands.

As part of the examination of commercial utilisation, the form of coppice management adopted on Lochtayside will be examined, and its relationship to market demand for the different types of produce. As part of this equation, the importance of geographical location will be discussed. The evidence for the production and sale of the principle commodities associated with coppice, i.e. timber, bark and charcoal, will be outlined. The affect of the adoption or not of coppice management will be discussed, primarily in relation to the tenantry, but also in the impact of coppice management on the composition and condition of the woodlands. Inevitably, the development of commercial plantation forestry will be discussed.

It would, however, be unwise, to draw from the conclusions of this study any broad generalisations regarding Highland woodland utilisation and management. Rather, it is anticipated that, as originally flagged by Lindsay, the evidence relating to woodland utilisation and management on the Breadalbane estates in Perthshire may help provide solutions to some of the aspects of the use of woodlands in Perthshire which still remain obscure (Lindsay, 1974; 675-676). In particular, by examining the documentary evidence from estate records of a single contained geographical unit, supplementary evidence can be added to help determine the degree to which the character of coppice management was regionally differentiated; a problem previously examined and discussed by Lindsay for other parts of Perthshire and Argyll (ibid., 460-463). Furthermore, it is anticipated that this will simply be a further step towards a more intimate understanding of the history of Highland woodlands.

CHAPTER ONE

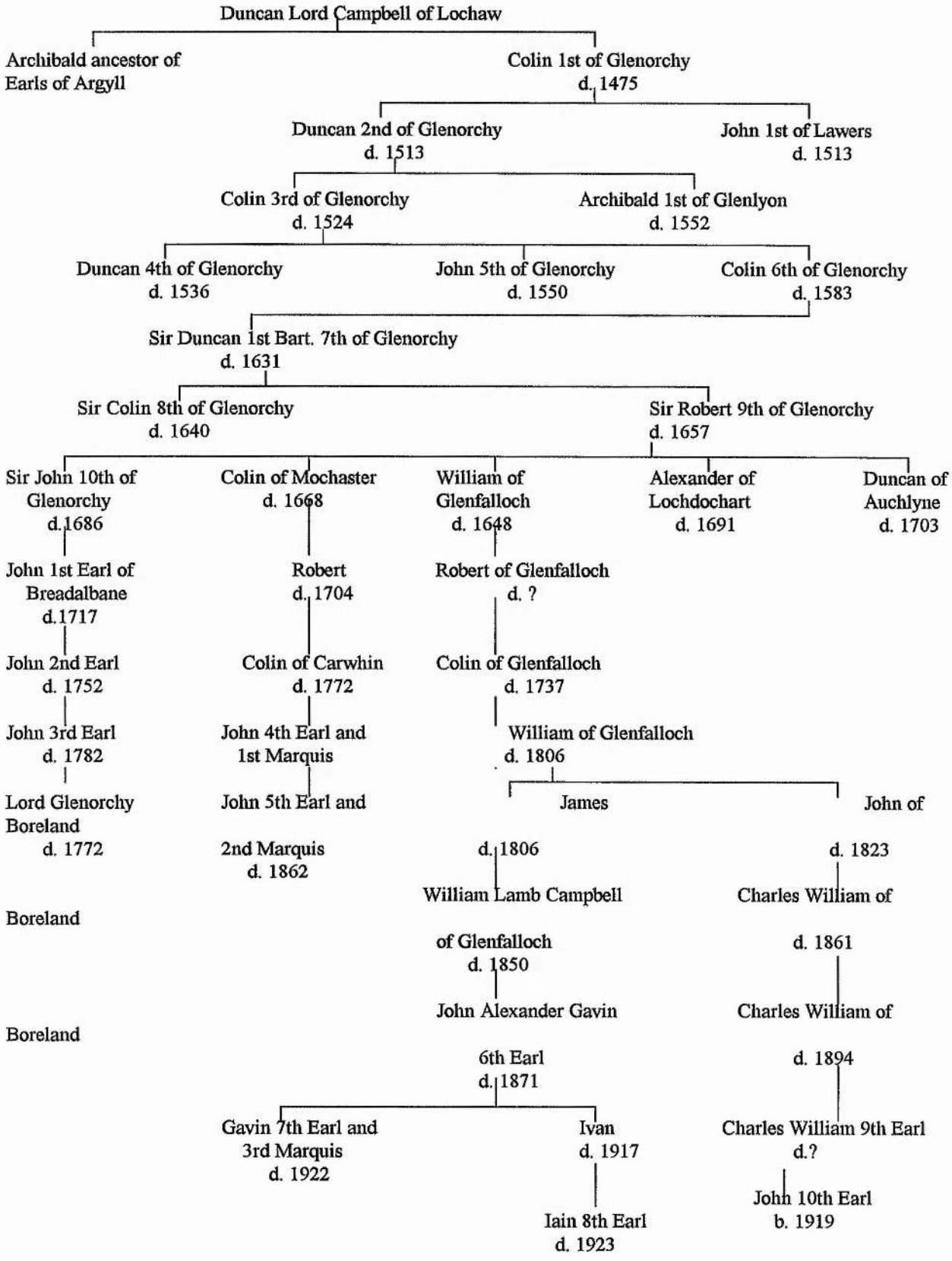
The Campbells of Glenorchy and their Breadalbane Estates

The Campbells of Glenorchy entered Breadalbane as landowners during the 15th century. Their singular domination over the political, economic and social life of that part of the central Highlands continued for nearly 500 years, until shortly after the First World War, when financial difficulties caused the 7th Earl and 3rd Marquis of Breadalbane, Gavin Campbell, to sell the eastern portion of the estate, including Taymouth Castle, seat of the Campbells of Glenorchy since the mid 16th century (See Figure 11). Today, the Breadalbane family own no lands in Breadalbane, the last connection being severed in the 1950's when Achmore House by Killin was sold (See Figure 2).

Throughout this period, the Campbells made attempts to utilise and manage the woodland resource of their estates. There is no doubt that during this period a form of coppice management was adopted in a significant proportion of the 'natural' woodlands of Lochtayside and elsewhere, on the Breadalbane estates. The decision-making process in relation to the estate policy, including how the woodlands should be utilised and managed, depended upon both the individual character of the successive Lairds and Earls, and on the prevailing economic conditions of the time.

Lindsay sees proprietors falling into three categories: those who treated coppice as a subsidiary income; those who saw it as an central to the planning of the estate; and those who took advantage of high prices, without applying any form of management. In which group a proprietor belonged might depend on how close the estate was to markets, and therefore how much profit could be expected (Lindsay 1974,380). Of course, there must be a certain amount of overlap between these categories, not least over time: however, the attitude of any landowner to his woodlands is critical to its management. The question that might be asked therefore is; did the Breadalbane Campbells' and their land managers, perceive the cutting and regrowth of the 'natural' woodlands, as a long-term, sustainable management regime, or was it simply a straightforward 'quick buck' approach.

Figure 2 Genealogy of the Lairds of Glenorchy and the Earls of Breadalbane



Source: Gillies 1938, 114; Duncan Millar 1995, 114, 182

In order to understand the history of management and utilisation of the woodlands of Lochtayside during the study period, as interpreted from the Breadalbane Muniments, it is therefore essential to understand the character and competence, the interests and influences, of the principal protagonists to be found in the estate records. At the head of the chain of command regarding estate management were the Lairds and Earls themselves. The next in command, on the ground, was their chamberlain and factor, who issued the Earls orders to the various local overseers, such as the ground officers of the officiaries, or to the woodkeepers. It may be suggested that it was the interaction of all these individuals' views on woodland management, dependent on the level of interest and competence of each person, that created the woodlands that exist today on Lochtayside. That is not to say that external economic influences, such as Lindsay highlights, including proximity and size of markets for woodland products, nature of demand, and accessibility to markets, and therefore how much profit could be expected, did not also significantly influence woodland management and utilisation in Breadalbane (ibid., 433).

However, it should be recognised at the outset, as Lindsay points out, that while estate management is a continuous process, and estate papers may therefore clarify the relationship between the condition of woodland, and the factors affecting it over a period of time, unfortunately, the systematic form of estate management associated with the keeping of records was also largely a feature of the period of agricultural improvement (ibid., 45). Coverage over the period of study is therefore only partial, being most concentrated after the second half of the 18th century.

Therefore, it is the intention of this chapter, to describe briefly these principal players, the times they were living in, and their areas of interest. This is best achieved by employing a chronological breakdown of the study period, based on the succession of the Lairds of Glenorchy and Earls of Breadalbane (see Figure 2), and linked to changing estate and woodland management policies in Breadalbane.

It might be argued that as the study period is essentially looking at the pre- and post- improvement Highlands, it would be more logical to use 1750 as a turning point in the social and economic affairs of Breadalbane, linked to the aftermath of

the '45. However, it may be suggested that with the death of the 3rd Earl in 1782, the era of the Highland chief who knew every inch of his possession and who had close cultural connections with it, was over; being replaced by a proprietor with a more detached, and certainly distant, view of his estates in the Highlands. Furthermore, it may be suggested, that the 1745 Rebellion was less significant economically across the Highlands, and agrarian change, which had already made inroads in the Highlands pre-1745, progressed rapidly in the second half of the century, despite the Rebellion.

Period One - 1640 - 1717, Turbulent Times

The first period strictly covers the years from 1640 to 1717: relating to two Baronets and the 1st Earl; Sir Robert, 9th Laird of Glenorchy, (1640-1657); Sir John, 10th Laird of Glenorchy (1657-1686), and John, Ist Earl of Breadalbane (1686-1717). However, it might be usefully extended back in time to the 7th Laird of Glenorchy, 'Black Duncan' (1583-1631) who is renowned as an early tree planter. Despite this awareness of Duncan's attempts at woodland conservation, this early period is marked by scant records relating to woods.

This was a period of political disorder and acute social and economic hardship, which can be partly attributed to the aftermath of the Civil War, and partly to a series of poor harvests. In the political turmoil of this period, the Campbells of Glenorchy were heavily involved; a fact which is likely to have influenced the running of their estates and, it may be suggested, had repercussions for the estate management policies employed well into the 18th century.

Prior to the Civil War, Sir Duncan, the 'black' Laird of Glenorchy, was Laird for nearly half a century, during which time he made very many additions to the estates already held by the family. By the end of the 16th century, the Campbells of Glenorchy were very much established in Breadalbane with their main seat at Balloch, now Taymouth Castle, at the east end of Loch Tay, and the eastern extremity of their lands. It was not until the mid 18th century, however, that they could claim total control of all the farms and officiaries of Lochtayside. Thus, Wester Ardeonaig on the south side of the Loch, only came into the possession of the Breadalbanes in 1744, when it was disposed of by the family of Patrick

Campbell of Murlaganbeg (Glenlochay), a natural son of Sir Duncan, 7th Laird of Glenorchy, killed at Ardeonaig in 1661.

It is said that Sir Duncan was determined to advance his power and influence by every means, whether fair or foul, involving both oppressing the poor and conspiring against the rich; a trait of the Glenorchy Campbells which seems to have recurred fairly frequently from then on (Gillies 1938, 135). Yet in spite of all his political scheming and skulduggery, Sir Duncan devoted some of his time to afforestation on his estates, and indeed, it might be argued, also to woodland conservation. Sir Duncan used his powers as Baron Bailie to promulgate his estate management policies. Through baronial statute, he required all tenants and cottars to set down and plant young trees, oak, ash and plane (sycamore) every year in their kailyards in proportion to the size of their holdings (Innes 1855, 354). For a tacksman of one merkland, this would amount to 6 young trees, and for a cottar, 3 young trees. The saplings were to be supplied by his own gardener in each district at the rate of 'twa pennies the piece', and were to be planted in the most 'commodious place of each occupation'. Although he is particularly known for his tree planting, and indeed there are still 2 Spanish chestnuts at Taymouth which were reputedly planted by Sir Duncan (Gillies 1938, 141), he also promulgated regulations, by way of the barony court, for the conservation of the natural woods, not just on his own lands, but also his neighbours and relatives land in Lawers and Glenlyon. A fine of £20 was to be imposed on any one cutting or in any way destroying young trees, and a reward of £10 was offered for information against the offender (Innes 1855, 359). This form of control over the tenants' abuses of trees and woodland has been demonstrated by Smout and Watson to have been common practice at the time, on the Menzies lands of Weem and Rannoch in highland Perthshire, and indeed, continued to be employed as a means of control right up to the end of the 18th century on the Breadalbane estates (Smout & Watson 1996, 998).

By the time Sir Duncan died in 1631, the Campbells were very much in the ascendancy in Scottish political life, and in possession of a large portion of Perthshire. It might be suggested that his descendants would, in the future, venerate his past achievements, and use him, to an extent, as a role model. He was succeeded by his eldest son, Colin, who unlike his father and younger brother

Robert (who was later to succeed him), both of whom had a taste for highland warfare and intrigue, pursued the arts, and is credited with being the first Scottish nobleman to encourage painting. However, the last two years of Sir Colin's life were disturbed by the War of the Covenant.

The period that followed was one of the most turbulent in Scottish history, and the Campbells of Glenorchy continued to be entangled in the turmoil. Civil War and unrest must have brought the country almost to its knees. During the autumn and winter of 1645, Montrose and the MacDonalds swept through Breadalbane and laid waste to the country, leaving Sir Robert, 9th Laird of Glenorchy, on the verge of ruin. Gillies' account suggests that they killed every man found with arms, they burned all the houses, destroyed the corn stacks, and drove the cattle away. Indeed, on the south side of Loch Tay only one house remained standing (Gillies 1938, 146). Even if this is a somewhat dramatic account of the Montrose raids, it is clear that such events were likely to severely affect agricultural activity, and any attempts at estate or woodland management. Furthermore, although Sir Robert received the estates free from debt, loss of revenue from his beleaguered tenantry, and increased expenses as a result of the War, left him considerably in debt, and his lands heavily mortgaged.

Sir John, 10th Laird of Glenorchy, succeeded his father in 1657, but was in turn very much eclipsed by his strong-willed and ambitious, eldest son, John who was later to become the first Earl of Breadalbane. Attempts at recovery in Breadalbane after the Civil War must have been difficult, particularly given the continuing unrest in the Highlands. This would not have been helped by the quarrelling between father and son, brought about it, is suggested (ibid., 157), by John Campbell, the younger's desire to secure for himself control of the estates. 'Iain Glas', Pale John, was said by a contemporary to be "cunning as a fox, wise as a serpent, but as slippery as an eel" (quoted in Gillies 1938, 163). In reality his control over the Breadalbane estates probably spanned nearly 60 years. It is difficult to say how much time he devoted to developing the management of his estates, for throughout his career, he was frequently to be found embroiled in political intrigue of one sort or another. These were to include: attempts to gain control of Caithness, and with it the title of Earl of Caithness; (which he did, but for the subsequent loss of which, he received the title of Earl of Brea D'Albane

and Holland in 1681); his implication in the massacre of Glencoe, which led to a period in prison in Edinburgh charged with high treason; and blame laid on him for appropriating money offered by the government to the Highland chiefs. Although old age prevented his active participation in the Jacobite Rising of 1715, his two eldest sons, Duncan, Lord Ormerlie, and John, Lord Glenorchy, along with 400 Breadalbane men, fought at the Battle of Sheriffmuir. Again, hardship and recriminations for the tenantry were to follow such political strife. Small garrisons were placed at Balloch and Finlarig, with provisioning of food and fuel for them expected from the same parishes which had suffered the ravages of war and famine over the preceding 60 years. The death of the 1st Earl in 1717 closed an era for Lochtayside and Breadalbane, which was marked by warfare and acute hardship. He died leaving the estates with debt to the extent of half their value (ibid., 177).

Period Two - 1717 - 1782 - Stability and Improvement

The second period, 1717-1782, covers an era when management of the estate was becoming more organised, and commercial exploitation of the 'natural' woodlands became more important, under the 2nd and 3rd Earls. John Campbell of Achallader and his son were chamberlains for the Earls, bringing a degree of stability and careful management.

Although John, 2nd Earl of Breadalbane, had taken part in the 1715 Rising, he escaped punishment, and took no further part in supporting the Jacobite cause. Thereafter, he concentrated his energies on his estates, both in Argyll and in Perthshire. This was made quite difficult initially by the continuing problem of cattle raiding from which Breadalbane, in common with other parts of the Highlands, suffered severely; and made more lucrative, it may be suggested, by the opening up of the English market after the Union.

Nevertheless, it was a period when the 2nd Earl was gradually getting the estate into a more solvent position. Curiously, it had been a stipulation of the 1st Earl's will that the estates should be run by commissioners, who included Patrick Campbell of Monzie (Lord Monzie) and Lord Polton. The 1st Earl had also employed John Campbell of Achallader as his chamberlain in Breadalbane about

1714, who was seen as a very capable man of good administrative ability and wisdom, and it is suggested that his factorship, along with his son's who succeeded him, extended to over 90 years (ibid., 178). It is not clear why commissioners were required, as the 1st Earl undoubtedly saw his son as a competent successor. It may have been that, aware of the level of debt he was to leave, the 1st Earl's intention was to give his son as much advantage as possible through good administrative support and advisors, combined with powerful trustees. Lord Monzie was a Breadalbane Campbell, a judge at the Court of Session, and a director of the newly-founded Royal Bank of Scotland.

Of the 2nd Earl, Gillies wrote, he "was a man of simple tastes and inexpensive habits [who] devoted his life to paying off the debts" of his father, and these efforts were seen as "worthy and successful" (ibid., 187). However, Duncan Campbell, a native of Glenlyon wrote in the late 19th century, of the 2nd Earl, "the Earl of Breadalbane was spending the closing years of a rather useless life at Bath, while his capable and energetic son, Lord Glenorchy was from Taymouth ruling Breadalbane and striving with might and main to hold it for the Government" (Campbell 1910, 66). While the latter is undoubtedly true, Campbell's assertions about the 2nd Earl seem rather unfair. In fact the Earl was certainly residing in Edinburgh during the highland army's occupation of it in 1745 (Gibson 1995, 3), and he also died there, at Holyrood Palace in 1752. Perhaps Campbell was more particularly referring to the 2nd Earl's political life, which had been rather low key, unlike most of his predecessors who had quite conspicuous, if not altogether illustrious political careers.

The 2nd Earl was not alone, among the upper classes, in preferring to concentrate his efforts on developing his estates, and early in his career had been a founder of the 'Honourable Society of Improvers in the Knowledge of Agriculture in Scotland, an early impetus to the development of a new approach to agriculture in Scotland (Mitchison 1982, 329; McGowan & Dingwall 1996, 21). Among his interests were his woodlands, both in Argyll and in Perthshire. Papers from the Breadalbane Muniments reveal a proprietor with a good knowledge of his woodlands and an interest in their care. He was keen to manage them, and advocated enclosure and exclusion of stock on Lochtayside. To achieve this woodkeepers were employed up and down the loch, and the local courts continued

to issue penalties to those caught stealing timber (GD 112/16/10) (Woodland management practices on Lochtayside during this pre-improvement era will be discussed in detail in Chapter 3).

There is evidence that his extensive, predominantly oak, woodland resource in Argyll was viewed in the same light, but, it was his 'firwoods' (Scots pine) in Glenorchy that appear to have been his first major venture into commercial exploitation; a venture which for him did not develop successfully. The arrival of two Irish speculators, Captain Arthur Galbraith from Dublin and Roger Murphy, a tanner from Enniskillen, and the resulting disputes and condemnation of the "desolation wreaked by the Irishmen" (GD 112/16/11) in the 1720s, may well have affected the Earl's and his son's, future approach to the management of their woodlands.

The 2nd Earl lived to the advanced age of 89, but in 1740, 12 years before his death, he officially devolved the management of the estates to his son, John, Lord Glenorchy, along with the responsibility for all "debts and demands" (GD 112/16/25). For the next 40 years, the 3rd Earl continued both to add to the estates, and encourage their improvement. The 3rd Earl (known as 'the ambassador', as a result of a stint as ambassador to the court of St Petersburg in the 1730s), a firm Hanovarian and Whig, enjoyed a fruitful political career. He largely prevented his tenants from rising in support of the Jacobites (although the Fearnan men on the north side of Loch Tay followed their superior, Robertson of Strowan), and as a result Breadalbane was largely spared the privation that befell other parts of the Highlands after Culloden.

Among other initiatives brought about in the 2nd Earl's lifetime, and developed by the 3rd Earl, were the lead mines at Tyndrum, and the growing of flax and development of spinning and weaving on Lochtayside. Lime kilns were built at Ardeonaig in 1729, and Finlarig in 1731, although Bil has suggested that the product had greater applications for bridge and house building than agriculture (Bil 1994, 11).

The 3rd Earl controlled a vast tract of land in the central and western Highlands, at a time when great changes were taking place politically, socially and above all

economically. It was the beginning of the 'Age of Improvement', when agrarian change accelerated in Scotland. It seems natural to assume that highland Perthshire would be one of the first parts of the Highlands for this great reorganisation in agriculture to develop, made more accessible by a receptive and intelligent landlord. The planting of new woodlands, commercial utilisation of existing woodlands, and beautification of the policies, became an important aspect of this drive for improvement on Breadalbane. One of the great legacies of the 3rd Earl, particularly for modern day geographers and historians, was the Survey of Lochtayside in 1769. According to McArthur the Survey may have been partly instigated as a consequence of the forthcoming passing of the 'Act to encourage the Improvement of Lands, Tenements & Heriditaments in that Part of Great Britain called Scotland held under Settlements of Strict Entail, 1770' (McArthur 1936, *xx*). The Breadalbane estates had been strictly entailed in 1704, and by the passing of this Act, the 3rd Earl was essentially freed of rather onerous conditions and provisions of the entail, thereby allowing investment in improvements and granting of long leases. 'Improving' leases were issued for about a quarter of the Lochtayside farms by the 3rd Earl, in the immediate years after the 1769 surveys.

The 3rd Earl died at Holyrood Palace in 1782. He had outlived his children, and the title and lands passed to his third cousin, John Campbell of Carwhin, whose father was a great grandson of Sir Robert, 9th Laird of Glenorchy. It may be suggested that this disruption in the Campbell line of succession also marked a break from more traditional Highland baronial rule.

Period Three - 1782-1862 - Prosperity and Alienation

The 4th Earl, 1st Marquis (1782-1834), and 5th Earl, 2nd Marquis (1834-1862) oversaw the estate during the third period, a time of much change in relation to both agriculture and woodland management. Plantation forestry and game management relegated 'natural' woodland to a subordinate economic role.

One of the principal internal forces operating upon the socio-economic system prevailing in Breadalbane in the latter half of the 18th century and early 19th century, was the increasing pressure on the land from a burgeoning population, a factor, of course, prevalent throughout the Highlands. Agricultural improvement,

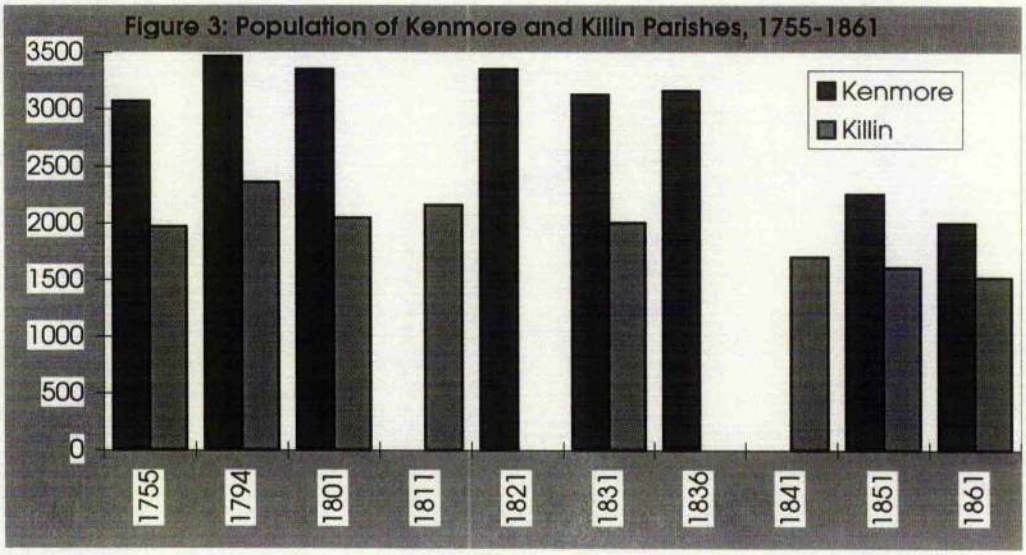
in particular, the increasing use of potatoes as a staple, the reduced incidence of epidemics, particularly smallpox, and more efficient estate control, all ameliorated the lot of the people, and encouraged further pressure on the land through overpopulation.

Population figures for the two main parishes encompassing Lochtayside - Kenmore and Killin - indicate that population peaked around the turn of the century (NSA, 471, 1090); thereafter declining, it might be suggested, in response to the dissolution of the traditional pastoralist way of life (See Figure 3). It has been suggested (Stewart 1990, 217; Whyte 1991, 157; Smout 1969, 334) that one aspect of this process of dissolution was the change in the relationship between superior and tenant. Thus, the paternalistic autocracy practised by the likes of the Earls of Breadalbane, which reflected the ancient traditional role of the Highland chief, was being superseded by the mores of a developing capitalist system which embraced material wealth and encouraged a higher standard of living. To finance the opulent lifestyles of these British (rather than Highland) landlords, and their grandiose building projects, demanded higher returns from their estates. Consequently, their lands were allocated less and less on the basis of kinship and more on the ability of the tenants to pay higher rents. It is against this background that the 4th and 5th Earls of Breadalbane developed their estate management policies.

John Campbell, the 4th Earl of Breadalbane, like many of his predecessors, had an active political life as a representative peer for Scotland in the House of Lords. In 1806, he was created Baron Breadalbane of Taymouth, and at the coronation of William IV in 1831, he was made the 1st Marquis of Breadalbane. He was therefore in the upper echelons of the British aristocracy.

In many ways the 4th Earl simply continued the process of reform of land management in Breadalbane initiated by the 3rd Earl. Attempts at reforms had obviously been met by a certain amount of reluctance to change, from a tenantry who were, by nature conservative. It was left to the 4th Earl to continue to push reform in estate management, by carrot, or by stick, in order to achieve the ultimate goal, an increase in agricultural productivity, and therefore rental income

from the estates.



Source: OSA, NSA

It is not clear what the 4th Earl's motives were, which stimulated the drive for estate improvements in the late 18th century; whether it was the desire to finance a lavish lifestyle, or simply a desire borne out of genuine concern for his tenantry, and the development of enlightened and judicious management of his estates, is impossible to determine. It is certainly true that the 4th Earl embarked on a major redevelopment of his principal seat at Taymouth which took about ten years, and resulted in a rather stately mansion house; grand enough to pay host to Queen Victoria in 1842, "in a princely style, not to be equalled in grandeur and poetic effect" (QV quoted from "Journal of our Life in the Highlands", 1866, in Gillies, 219).

Right from the beginning, the 4th Earl seems to have had a desire to increase the revenue of the estates, and expected that his woodland resource could play an important role in meeting his revenue raising objectives. Like his contemporary, the 4th Duke of Atholl, the Marquis was widely known as the 'planter Earl', and indeed, it could be argued, was one of the early pioneers, and proponents of Scottish forestry. In a letter from John Campbell of Achallader, who continued as factor for Breadalbane, to the Earl in 1784, he responded to remarks made in a previous letter from the Earl, in which the Earl must have suggested a method for the cheap cutting of timber. The Factor reminded him that "timber is not of such value in this country, as it is in the low country or on the sea coast" (GD 112/15/438). It is perhaps fortuitous that the young Earl, then only 22 years old,

had the level-headed Achallader to guide him through his early years. However, after the death of Achallader several years later, the continuity of factorship was broken, and there followed a number of factors, some obviously better than others, until the 1830's when James T Wyllie came to Breadalbane.

By the 1790s changes were afoot. The Napoleonic Wars had begun and the eminent agriculturalist, William Marshall was brought in to advise on estate improvements; both had repercussions for the Breadalbane woods (GD 112/16/13/10). War brought inflation and vigorous economic activity to Britain as a whole and a great demand for, among other commodities, coppice produce, especially bark. There was therefore now more incentive for the 4th Earl to increase the commercial exploitation of Lochtayside's woodland resource, as part of the overall drive for improvement, and this growing interest is certainly demonstrated by more references to woodland management in the documentary record.

It appears that Marshall's observations (ibid.) formed the basis for a major reorganisation of the estate around 1795, which included the introduction of a General Lease. There was also a rationalisation of staff, with, for example, the reduction of woodkeepers along Loch Tay from nine to two. Henceforth the responsibility for the care of the woods was to be placed firmly on the tenantry, strict rules were pronounced regarding removal of trees, and woods were sold by roup (auction), with even the needs of the castle being met by purchase at the roup. The impression given is of a 'tightening of the belt' by the Earl; though, there is no indication at this time that the Earl was in financial straits. This rationalisation, and the new division of responsibility, may simply be interpreted as a requirement and prerequisite for improvement and economic efficiency, the Earl may simply have been, by nature, rather parsimonious. The reduction of woodkeepers may also be indicative of the move away from employing local men as woodkeepers to bringing in specialist foresters with a wider remit, as has been suggested by Smout and Watson (1995).

There is clear evidence that the Earl and his factors, during this period, were aware of the necessity of enclosing woods and other conservation methods. Repeated instructions were issued to woodkeepers regarding strict controls for managing the

cutting and selling of trees. Whether these orders were executed as intended would depend on the abilities of the woodkeepers. During this period the Earl received reports from, and issued direct orders to, a succession of woodkeepers. These documents, which are particularly numerous from around 1790 until the mid-19th century, provide an important insight into the changing nature of woodland management, and the role of the woodkeeper during this period. Malcolm McGregor, for example, a woodkeeper who was brought into Breadalbane from Glenorchy around 1815, appears to have espoused contemporary principles of management, which were more pro-active and interventionist than his predecessors (GD 112/10/2, Monteath 1824, Robertson 1813, Nicol 1799) (see Chapter 3 for a more detailed discussion of the role of woodkeepers).

His other duties included assessing the need for thinning plantations, overseeing woodland enclosure and labourers working in the woods, and roups. There was, however, an east-west dichotomy in relation to the emphasis on woodland exploitation on Lochtayside, which is borne out in the woodkeepers' reports. McGregor's reports relate mainly to the 'natural' woods, and in particular, oak coppice, there being no major plantations along the western half of the Loch. On the other hand, around Taymouth in particular, the plantations on Drummond Hill were assuming much greater importance than the natural woods. Drummond Hill had been, largely, converted to plantation from around the middle of the 18th century and there were no large oak coppice woods in this area. Furthermore, many of the less commercially valuable woods along this eastern section of the Loch were being utilised for local use.

The cutting of ferns in enclosures, a common practice on Lochtayside, also became frowned upon, during McGregor's tenure due to the damage caused to the dykes. In fact, the Earl eventually ordered the prohibition of anyone entering wood enclosures. This appears to have been largely the result of the increasing importance of game. Roe and fallow deer were positively encouraged in some woods and plantations, and the woodkeepers started, during this period, to take on the responsibilities of gamekeeper.

It may be suggested that it is during this period that the final alienation of the tenantry from the woodlands was effected; a process begun when tenants' customary 'rights' to take timber etc. were curtailed early in the 18th century. The Earl made it very clear, in the General Lease of 1797, that he would have complete control over enclosing and preserving woods and trees on farms, including above the head dyke. If he so wished, he could have an area enclosed and planted without the tenant having any deductions on rent for loss of grazing. At the same time, tenants were to be bound to cover half the expense of keeping dykes in proper repair. If tenants were caught "cutting without liberty, stealing wood or growing timber" they could face forfeiture of the farm (GD 112/10/2/2).

Removal for stealing wood does appear to have taken place, but it was not a common occurrence. As Smout and Watson have suggested, it may have been more in the interests of landowners to exact a pecuniary fine than to remove the transgressor (Smout & Watson 1996, 999). Removals on Breadalbane in the late 18th century and first half of the 19th century occurred more in response to the overpopulation of the district, attempts at improvement, which included a desire for single tenancy farms, and the higher rents afforded by sheep farming, than for committing wood offences.

Breadalbane was undoubtedly undergoing some of the difficult social and economic changes that were also affecting other parts of the Highlands. Gillies suggests that both in 1795, and around the middle of the 19th century, a number of farms were cleared (Gillies 1938, 200, 211), some of which were then established as sheep runs, particularly in the higher and more agriculturally marginal parts of the district, although shielings largely remained untouched until the early 19th century (OSA: 468,486; NSA: 473,1090). But, as long as coppice woodland held its value and remained enclosed, the black face and cheviot sheep would pose no more of a problem to the woodlands than the native livestock had done, up until then. The threat to the indigenous people from sheep farming was immediate but, to the natural woodlands, the threat only became evident after the woods lost their value, a discussion of which is beyond the scope of this study.

Modern-day perceptions of the autocratic and apparently harsh methods of creating improvements on the Breadalbane estates may not be appropriate, but

neither is it easy to glean a contemporary view. The travellers' accounts tend to be either sycophantic, or oblivious of local opinion. In 1793 Heron, on a journey through the western counties of Scotland (Heron 1793) suggests a contented Breadalbane tenantry. On encountering a party of farmers in a Killin inn, who had been given 100 cheviot sheep to divide among them, Heron was informed by the innkeeper that the Earl was, not surprisingly, "highly and universally beloved by them". He goes on to claim that "the whole tenantry will cheerfully take leases at whatever increased rent their landlord may choose to demand; for their confidence in his goodness persuades them that he will not think of imposing any intolerable burdens" (ibid. 265). However, only five years later, Alexander Campbell found the tenantry in a different mood, and was quite censorious of the effects of reform on Lochtayside (Campbell 1802, 196-9), particularly the level of rents which, in his view, was contributing to the increased rate of emigration, which was now "more numerous than any hitherto [and]....about to take place, unless prompt and conciliatory measures be adopted to mitigate the grievances (real or supposed it matters not) of which the Breadalbane people loudly complain" (ibid., 199).

Whatever the tenantry thought about the reforms that were being imposed on them, it would be too simplistic to assert that estate policies were arrived at in a clear-cut, systematic manner. There appears to have been much discourse on the subject among the estate decision-makers, and McArthur affirms that the 4th Earl even thought of banishing sheep from Breadalbane in an attempt to maintain the population. The problem of what to do with his people obviously vexed him again in 1815 when he wrote to his factor "I do not wish.....either to give encouragement to emigration or absolutely to discourage it, if it appears at all on my estates" (McArthur 1936, *lxxiii-lxxiv*).

While sheep were not banished from his estate, the Earl and his factor did continue to encourage rural industry, particularly spinning and weaving. Another strategy employed on Breadalbane for dealing with overpopulation, and also commonly instituted in other Highland districts (Stewart 1990, 161), was the resettlement of cottars and poor tenants in new villages which allowed the establishment of wage earning smallholders, thus alleviating some of the pressure on the land. The villages of Stix, Croftmoraig, Achloa, Acharn and Stronfearnan

were established about the end of the 18th century, and beginning of the 19th century, with occupiers provided with pendicles, and given work on the estate. Both Kenmore and Killin, which had been developed earlier in the 18th century, had, by the time of the first Statistical Account in the 1790s, a large number of tradesmen and journeymen, including weavers, shoemakers, wrights, tailors, smiths, flax dressers, masons, coopers, bakers, and other merchants (OSA XII, 467, 483).

The Earl also spent considerable sums of money on laying out plantations, road and bridge building, and also subsidised the building of new farms by allowing tenants free timber and slates for their construction. Indeed, many of the trades being encouraged in the villages were also users of local timber, particularly the wrights and coopers, and possibly the shoemakers, if one assumes that they were utilising locally tanned leather. All in all, the local markets for woodland produce were well established and, concomitant with this, an increasing specialisation of trades was developing. Roup rolls for this period point to a reduction in the numbers of farmers and non-tradesmen purchasing timber. This increasing specialisation, combined with a tenantry alienated from the woodland resource, would have been instrumental in the breaking of the link between woodcraft and farming.

The 4th Earl died at Taymouth in 1834. Over the 50 years of his control of the Breadalbane estates, he had to contend with a rapidly changing socio-economic system. He may have been penny pinching in relation to the running of the estate, but this did not extend to his own standard of living. Fortunately, the Earl, like his kinsman, the Duke of Argyll, had the advantage over the Highland chiefs - who relied for their wealth on a marginal resource base - of superior revenue-raising estates in the more fertile central and western Highlands, and in the Lowlands. He was, therefore, better able to face the economic realism of the time, and do his best to assimilate Breadalbane into a more modern economy without unnecessary hardship, or the worse excesses of some other Highland landowners.

In his lifetime, he had seen the value of woodland products, particularly tanbark, dramatically increase. It was no wonder therefore that he developed an interest in

forestry, and encouraged woodland management. While the value of tanbark decreased (Lindsay 1974, 405) after the Napoleonic Wars, timber was becoming more valuable, and the relatively large-scale plantation on Drummond Hill was approaching economic maturation. The gradual shift in emphasis from natural woodland to plantations is detectable during this period of the 4th Earl's control, as was the greater attention being paid to the encouragement of game, and the role of woodlands in their management.

John Campbell, only son of the 4th Earl, was 38 years old when he succeeded his father, as 5th Earl and 2nd Marquis in 1834. He had followed the, by then, customary English educational route for the Scottish aristocracy, and thereafter followed his forefathers into Parliament in 1820, initially as a member for the English seat of Okehampton. There followed a series of prestigious public appointments, including Privy Councillor and Lord Chamberlain of the Household. According to Gillies, he left the management of his estates to others, and in particular, relied, in Breadalbane, on his factor, James F Wyllie, who proceeded to clear a number of farms on Lochtayside for sheep, which was to rouse a great deal of resentment in the district (Gillies 1938, 211). Gillies, although not openly censuring him, which would have been unthinkable given the relatively short timespan since the 5th Earl had been alive when Gillies was writing, and his position as minister in Kenmore parish, nevertheless, described the 5th Earl, rather unflatteringly, as "a man of austere cast of countenance and commanding presence...proud of his ancestry and his exalted position" (ibid., 211). However, he also added that the 5th Earl's "ability, munificence and virtues made the name of Taymouth famed throughout Europe" (ibid., 220).

If forestry had been the hobby of the 4th Earl, then geology was the hobby of the 5th Earl, and, it might be argued, his greatest folly, for although he appears to have had much less involvement in the running of his estates than his predecessors, he did take an active interest in the development of mineral exploitation on the estates. He was, according to Gillies, a keen geologist who believed that there was great wealth hidden in the rocks of Breadalbane (ibid., 212). He reopened the Tyndrum lead mines (closed in 1798), developed a copper mine an associated processing works at Tomnadason on the south side of Lochtayside, and instigated various trials for other minerals in the district, all of which proved fruitless.

According to the 1st edition Ordnance Survey (OS) map of 1861, there was also a chemical works at Tomnadason. This may have been where attempts were being made at producing sulphuric acid from a by-product of the copper mining operations (see Chapter Three for full description). All of these ventures, however, appear to have been financial failures, and indeed, probably drew heavily on the Earl's financial resources, arguably, significantly affecting the future financial security of the estate.

The 5th Earl died in Lausanne, Switzerland, in 1862, leaving no son and heir, and thereby plunging the estate, and title into a period of inertia, through 5 years of dispute over who would succeed. Much had changed in the hundred odd years since the 3rd Earl had commissioned the Survey of Lochtayside. The synthesis of a new socio-economic system was well advanced. The population had declined significantly (Stewart, 1984), and the agricultural reforms had been largely achieved. Sheep continued to play an important role in the rural economy, but above all, Breadalbane was developing into a Victorian sporting estate. This may have helped to maintain woodlands, which provided an important habitat for game, although there would be a conflict with heather burning when red grouse became important , but direct commercial exploitation of the natural woodlands was beginning to decline (Lindsay 1977a, 35). Plantation forestry, however, was still in its ascendancy, and although charcoal, for example, was still being produced, and bark harvested, most of the references in the estate records relate to the growing importance of softwood production, particularly larch, which was used, for example, as sleepers in railway construction, a rapidly-expanding form of infrastructure at the time.

Summary

An examination of the history of the Campbells of Glenorchy, their factors and woodkeepers (agents in woodland management), their interactions with these subordinates, and also their impact on estate, and in particular, woodland management policies on Breadalbane, specifically Lochtayside, reveals a complex set of factors, external and internal, at work, influencing the development of woodland management on Lochtayside over the period, 1650 to 1850; a period in

which the Highlands and its margins, witnessed the development and growth of commercial exploitation of its 'natural' woodlands, and subsequent decline.

To facilitate an understanding of the forces at work in the of development of management and utilisation of Lochtayside's woodlands, and the decision-making involved in this process, a chronological breakdown was employed, which highlighted the various influences on, and character and values of, the successive Lairds and Earls of Breadalbane, with reference to their subordinate agents.

There is little doubt that the changing political and economic system had a major impact on the utilisation and management of woodlands in the Highlands, and in this respect, Breadalbane is no different. However, part of the process of change must also include the explicit decisions and choices made by those with power to act, in response to, in particular, developments in the economy. Whether an Earl adopted or rejected management options depended as much on his social and educational background, and individual character, as on economic and political factors. The responses of the successive Earls was therefore dependent on a wide range of factors which led to continual reorganisation and modification of woodland management policies throughout the period. A unique set of circumstances therefore influenced the management and utilisation of Lochtayside's woodlands, and this should always be borne in mind, in later chapters, when the detail of woodland management and utilisation on Lochtayside is examined.

CHAPTER TWO

An Evaluation of Sources for a Local Woodland History Study

An examination of the utilisation and management of Highland woodlands by means of a local case study requires an understanding not only of estate management policies, and the decision-makers involved, but also, to a greater or lesser extent, the social, economic and political circumstances which influenced that district's woodlands. In order to construct a picture of the utilisation and management of Lochtayside's woodlands, and the wider rural society and economy, of which it was an integral part, a critical examination of a number of sources was required.

It was not possible, however, within the scope of this study to utilise all sources and methods of investigation available. Indeed, some avenues of investigation are not easily accessible to the document-based woodland historian, in particular, palynology, field archaeology and the study of place names, all of which require a further degree of specialisation and technical skill.

Estate papers, in this case the Breadalbane Muniments, formed the most important source for this study, but could not be relied upon to tell the whole truth, or give a cloudless picture of events and processes. It was, therefore, essential to seek information from other sources, both published and unpublished, written and cartographic, and through some preliminary field investigation. The cumulative effect of bringing together many snippets of information in mutual support, from a wide range of independent lines of evidence which individually merely suggest a certain course of development was therefore to give a much clearer and, importantly, reliable picture of events and trends, which together shaped the history of Lochtayside's woodlands.

It is therefore the intention of this chapter to examine critically and to evaluate these sources, in terms of their disadvantages and advantages, and apply this to an investigation of the history of Lochtayside's woodlands.

The 18th and 19th Century Accounts - Ministers, Tourists and Improvers

It is important to recognise at the outset that while a body of published work emanating from the local ministers, from tourists or from improver propagandists can provide a useful outline and general framework for the study of contemporary Highland rural society. Nevertheless, the authors of these works were writing from a very different perspective to that of the modern historian or geographer,

and often were less than objective. It is clear, from reading current literature that the Statistical Accounts, the 'Improvers' reports, and the travellers diaries, must be read with caution, and interpreted with regard to their limitations (Whyte 1979; Lenman in OSA 1977, *XII*; Bil 1990; Dingwall 1996 Scottish Woodland History Discussion Group (SWHDG) conference; Smout 1969). That said, a plethora of useful information can be obtained from these sources which, when backed up by documentary and cartographic evidence, can more clearly define the character of highland Perthshire's rural economy in the late 18th century, and first half of the 19th century.

There is also clearly a wealth of information in the contemporary guides and treatise on forestry methods in Scotland (Monteath 1824; 1827; Nicol 1799); indeed, much of this knowledge has since been lost to modern-day forestry. These volumes contain detailed descriptions of coppice techniques, fencing methods, timber and bark prices, wood contracts and timber imports; however, they contain few references to Breadalbane, and are therefore of little direct value, in terms of local factors affecting the management and utilisation of Lochtayside's woodlands. Their relevance for the local woodland history study is perhaps as a comparative tool, to provide a benchmark exemplifying best practice in forestry during a period when, in the Highlands, coppice management was at its peak, which can then be used for comparison with information gleaned from the Breadalbane estate records.

The accounts and reports of the agricultural 'improver' consultants and itinerants also provide a useful, if rather biased, insight, into the state of traditional Highland pastoralist society, and its changing character (Marshall 1794; Robertson 1813; Wight 1778-84; Loch 1778-79). Since these changes underway at the time were being supported by their advice, through these publications, one must therefore be careful not to accept their views uncritically. Equally, as Whyte (1979, 3-4) has pointed out, it is dangerous for the researcher to accept their views on past agricultural practices based, as often as not, on hearsay and tradition, with some historical facts thrown in; given that they were attempting, by their arguments, largely to overthrow these traditional agricultural practices, the legacies of which often prevailed.

If one accepts and is prepared, however, to consider the direct descriptions of the farming practices, without the attendant judgements, then these contemporary accounts can prove very useful, by filling the gaps in knowledge, and providing a general background for more specialised case studies. Furthermore, in some cases they contained detailed accounts of specific estates. William Marshall illustrated

much of his thinking, with reference to the Breadalbane estate on which, as already mentioned, he spent the summer of 1792, employed as adviser to the 4th Earl, and outlined his proposals for improvement of the estates of the central Highlands, it must be supposed, with that estate in mind. Marshall was highly respected, and a very astute reader of the countryside. He had an unusually positive view of the Highlander's character, and indeed had the foresight to see the imminent population crisis which was about to tear the heart out of the Highlands. One of his principal proposals for improvement was to retain the rural population for, he stated rather prophetically, "should the Highlands of Scotland be once depopulated, it might be found difficult to re-people them" (Marshall 1794, 18, 52).

There is little doubt that he was keen to see changes take place in the agriculture practised in Breadalbane, and elsewhere in the central Highlands, and was heavily critical of some aspects of traditional agriculture (Bil 1990, 19; Marshall, 1794, 51-68), but the detailed descriptions of such aspects of rural life as, for example, house construction, form of enclosure, state of the roads, farm implements, crops raised, current layout of farms, and methods of farming, are invaluable to researchers in the historical geography of Breadalbane. He also described woodlands and plantations, on which subject he seemed generally satisfied with the "spirit of planting and preservation of woods", although he declared that best practice in the past, had only been kept up within sight of the great houses (ibid., 27). Further planting of shelterbelts, hedges, and laying out of new coppice as a fuel source, were strongly advocated (ibid., 51). Interestingly, he remarked, with regard to coppice, that its care was not ubiquitous, and cited Atholl and not Breadalbane, as a good example of coppice which had "long been brought into a course of cutting", while both Taymouth and Atholl were noted for planting (ibid., 28). Indeed, two years later, in a subsequent publication specifically on the subject of planting and rural ornament, Marshall again referred to the Taymouth policies, the adornment of which he obviously saw as an important part of the estate 'improvements'; and referred to the advice he had given to the 4th Earl to enhance the ornament of the policies in previous years. Although he was principally an agricultural consultant, he was very much taken with the ideal of improvement by enrichment planting, not for the potential commercial value of some of these trees, but purely for their ornament, and this was borne out by his observations made directly to the 4th Earl of Breadalbane (GD 112/16/13/10).

It is likely that the Board of Agriculture County Agricultural Report for Perthshire, which appeared some 10 years later, drew on the work of Marshall. However, as one might expect, there were few specific references to Breadalbane in that later

report (Robertson, 1813), but it did provide more detailed information on the coppices of Perthshire as a whole than Marshall, and claimed that "there are more oakwoods and of greater value in this county than the rest of Scotland" (Ibid., 263). It is not surprising that its author, James Robertson, should emphasis the value of coppice, for he was the minister of Callander parish in south west Perthshire, which was one of the main tanbark producing areas of Scotland at the time (ibid., 263; Lindsay 1974, 461).

As parish minister, Robertson was also one of the authors of another important source for the study of 18th and 19th century society, the Statistical Accounts of Scotland (often referred to as the Old Statistical Account, hereafter OSA, *XII*: 137). The Accounts were by parish, and were usually completed by the incumbent Minister. They relied therefore, on the quality of work produced by these ministers. Along with the subsequent New Statistical Account of Scotland in the 1830's and 1840's, (hereafter referred to as NSA), which was an update from parish minister, and sometimes rather repetitive, the Statistical Accounts have both been heavily criticised for being deliberately biased, and equally regarded as being essential, if rather frustrating sources, providing a good deal of information about the changing face of Scottish society (Whyte 1979, 3-4; Dingwall SWHDG conference, 1996; Lenman 1976, in OSA, *XII*: *xxiv*).

Lochtayside was incorporated nominally into three parishes: Killin, in the west, and stretching westward as far as Tyndrum; Kenmore, covering the majority of Lochtayside; and the detached portions of Weem parish, including Crannich on the north shore of Loch Tay, and Achmore, on the south side, at the head of the Loch. An examination of both Statistical Accounts for Kenmore and Killin parishes in particular, can throw a good deal of light on the character of life on Lochtayside at the time. Although not furnishing the same level of detail as Robertson did in his account for Callander, the ministers of Lochtayside, who were above the inhabitants in both rank and education, clearly knew their parishes and parishioners well and, being Gaelic speakers themselves, must surely have had more empathy with the Lochtayside people than either Marshall, a non-Gaelic speaker, or the many 'tourists' who passed through, and wrote about Lochtayside during this period.

Of the woods of Lochtayside we learn very little. Colin McVean, minister for Kenmore parish in 1794, made only a few remarks about the "delightful and picturesque, [and] pleasing variety " of woods, which only revealed the romantic tendencies that many of these ministers displayed (ibid., XII, 459-470; *xxxvi*). Patrick Stuart, who was minister of Killin parish, and had 20 years earlier

displayed a great deal of botanical knowledge while escorting the Scottish naturalist, James Robertson, over the Lawers hills to Glen Lyon, related in his account with regard to woodland management, only that "they are now mostly enclosed, and taken sufficient care of by their several proprietors" (Henderson & Dickson 1994; OSA *XII*: 475). It should be pointed out, however, that like most other incumbents, Patrick Stuart relied on aristocratic patronage, and although not related by blood to the 4th Earl of Breadalbane, Stuart was the son of a Campbell mother, and married to a McArthur, a Campbell sept (ibid., *XII, xiv*). Consequently, if the Earl was not taking much care of his woods, it is unlikely that Stuart or his neighbouring clerics would have revealed the whole truth in these accounts. The difficulty therefore lies with interpreting "sufficient", for without recourse to other less ambiguous documentary evidence, such statements can be, at worst untruthful, and at best ambiguous and generally open to contention. Therein lies a serious weakness of the Statistical Accounts.

Nevertheless, a wider trawl of Perthshire parishes provided information on two further aspects of the study. Firstly, on a more general level, a reading of the accounts of neighbouring parishes gave a better understanding of the processes of change underway in highland Perthshire at that time, which were transforming the old, largely self-sufficient, traditional society into a new commercially-orientated capitalist world. In the 1790s, as has already been mentioned in Chapter One, the inherent resistance to change seemed to result in a continuance of a largely traditional multi-tenancy, pastoralist farming system, while by the 1840s, many of the reforms advocated by the likes of Marshall and Robertson had been accomplished.

Secondly, the location of possible markets for woodland and coppice produce from Lochtayside was explored by examining the accounts of the nearest towns to Lochtayside. Thus, according to the accounts, tanneries existed in the 1790s in Dunkeld, Crieff and Perth, while by the 1840s only Crieff and Perth had tanneries (NSA X, 96, 514, 989). Which of these tanneries was receiving Lochtayside bark, if at all, could not be determined from the accounts. Part of this problem, of course, lies with the geography of Lochtayside, for Crieff had easier access to the western lochside woodlands, while Perth was closer to the woodlands around the village of Kenmore. It is evident also that the Statistical Accounts are less useful on specific research problems, unless it is in a 'pet' subject area of the authors.

In conclusion, the Statistical Accounts were able to provide a general overview of a Highland society undergoing great change, through the eyes of men apparently torn between a respect for their Gaelic culture and language, and a relentless drive

for improvement which ultimately would bring about the near dissolution of that very culture and language they sought to maintain. Beyond this general insight, reliance on the Accounts is unsafe.

If ministers could be accused of in-built prejudice and sycophancy, then the 'travellers' have been additionally censored for giving incomplete and unbalanced impressions of Scottish life in their commentaries, as a consequence, not just of their biased attitudes to the Highlands, but also for their unfamiliarity with the society which they were describing (Bil 1990, 7). It is therefore important to recognise that this type of material relates almost entirely to the preoccupation's of the individual writers and their audience who, for the most part, were not concerned with what was happening to a wood, rather how it added to the aesthetic value of the landscape. There was therefore a whole procession of travellers passing through Breadalbane on, what Pennant called the "petit tour", whose main concern in writing an account of their travels was with highlighting the beauty spots, and describing the topography from a purely aesthetic standpoint (Pennant 1774; Heron 1793; Newte 1791; Pococke 1887; Wordsworth 1875; Lauder 1834). In consequence, their accounts in general were merely highly subjective impressions, often coloured by such ephemeral event as the weather. Pennant was perhaps a bit an exception for he was quite observant, particularly of nature, and also made some useful comments on the economy.

Nevertheless, some like Burt, who was not strictly speaking a traveller, have left some memorable, and wonderfully engrossing accounts of life in the Highlands (Burt, 1754), while others quite unintentionally have provided fascinating descriptions of the living conditions of the lower orders, such as Heron's description of the squalor of the boatman's house at Logierait, on the River Tummel, to the south of Pitlochry (only some 15 miles from Breadalbane)(op.cit., 223).

It must also be remembered that the travellers' accounts differed in one important respect to the ministers' reports, in that the former were largely free from the shackles of aristocratic patronage, and were therefore able to relate, without fear of reprisal, any injustices or mismanagement that they observed on their travels. For example, Campbell's condemnation of rents on Breadalbane have already been referred to in Chapter One, and Wight also cast doubt on the level of interest (7.5%) that the 3rd Earl of Breadalbane was requiring for building enclosures, without actually taking on any of the burden of cost himself (Wight 1781: 198).

Of course, a person could only comment on what was before their eyes, and it is interesting to speculate why there were so few eyewitness reports of woodland management in action, while there are occasionally accounts of labourers viewed working in the fields. It may be suggested that woodland management, and more particularly felling or clearance of large areas of trees or old trees, was undertaken well out of sight of passing travellers, whose aesthetic sensibilities might have been crushed on viewing such destruction, so moving them to deplore, in writing, the actions of the proprietors who did such foul deeds. This contention is supported by a document uncovered in the Breadalbane Muniments by Fiona Watson (per. comm.), in which the Argyll factor reports to the 4th Earl in 1816 that a group of old oaks could be felled, "as the old oaks are mostly out of sight of the Public Road, the appearance of this beautiful Glen will not in the smallest be hurt in view of the many travellers who frequent Dalmally in the summer season" (GD 112/14/12/8/22).

All of the aforementioned sources must therefore be regarded as indispensable for a local woodland history study, for without them a less informed picture of the many factors influencing the history of a particular area would result. That is not to say that they should be accepted uncritically, or relied on entirely. There is no doubt that documentary and cartographic sources are equally essential, if not more so, but even these present problems of interpretation and understanding for the woodland historian.

Documentary Sources - The Breadalbane Muniments

It is now firmly established in historical geography that the utilisation of historical documentary sources is essential to the study of Scottish rural society in general, and woodland history, specifically, in the late medieval and modern period. Indeed, it has been argued that without reference to such sources, studies could only scrape the surface and provide a general framework for the study of agriculture and the rural economy of the Highlands (Bil 1990; Whyte 1979; Lindsay 1975a). It is also accepted that although the chronological range of documentary source material existing for Scotland is not as extensive as that which is available for England, where many more early medieval documents exist, such as Domesday Book, nevertheless there is available for Scottish historical geographers a wide array of archival sources for the period under consideration. These include newspapers, old maps, the Register of Deeds, and Register of Sasaines, Sheriff Court records, Burgh Council papers, estate Muniments and Exchequer records (including those for the Forfeited Estates); all of which have been employed in varying degrees by historians and geographers, including

woodland historians (Anderson 1967; Dodgshon 1981; Gray 1957; Lindsay 1974; Leneman 1986; Rymer 1980; Whyte 1979).

It is, however, essential to appreciate that some of the above-mentioned sources are more useful than others for a local woodland history study. Thus, Burgh Council records may yield information about mercantile activities such as tanning, timber imports and exports, and trade with the burgh's hinterland which could provide a link with the sale of woodland produce from a particular locality. The time required to survey and extract a few snippets of information may not, however, be appropriate for short duration research projects. One must therefore rely on secondary source material in which the principal emphasis may not have been woodland history (e.g. Vasey 1987).

Previous sections of this chapter have emphasised that although primary printed sources are indispensable, documentary and cartographic sources provide the most important source. Given the time restriction imposed on this woodland history study, estate papers were targeted as the documentary source which could yield the greatest abundance of information relating to woodlands on Lochtayside, and it is specifically upon the evaluation of this type of documentary source that attention will be focused.

Estate papers can generally be divided into several categories, including maps and plans, rentals charters, tacks and leases, legal records, accounts, diaries and correspondence. It is also worth finding out whether the estate being researched was subject to forfeiture following the 1688 revolution, and the 1715 and 1745 Jacobite rebellions as papers relating to the general management of that estate should be held in the Exchequer records, and although the period of forfeiture may be as little as 20 years, nonetheless it was a period of very active intervention in estate management by the Commissioners who administered the forfeited estates as representatives of the Government. Thus, the lands of Fearnan on the north side of Loch Tay were held by the Robertsons of Strowan who had their estates forfeited three times. They were finally disposed to the 3rd Earl of Breadalbane in 1767 in excambion for part of the lands of Pitkellony in Strathearn.

Rentals which list the names of farms and tenants on the estate, include details of the rents paid by each tenant, both monetary, and in kind and services. Charters tend to contain the earliest information available and outline the rights and privileges accorded to the charter holder. Tacks and leases which could be granted for farms and land, but also for mills, houses and teinds, detail the conditions for the tenancy. Court records, from both barony and regality courts

provide details, not only of the offences committed by the tenantry and their punishments, but also of estate regulations promulgated by the landowner which in the absence of written lease, essentially declared best practice for a locality, and local enactments of parliamentary legislation which provide evidence for problems peculiar to that locality. Accounts produced by the estate factor usually contain details of the yearly income and expenditure of the estate, in summary form, and also include many small items relating to the accounts, such as vouchers and discharges. Diaries are usually more concerned with personal and family matters, but can yield snippets about rural life and society, while correspondence, including estate memoranda and reports, particularly between landowners and those involved with estate affairs such as agents, employees and legal and business advisers, can provide a particularly useful overview of the decision making process.

Reliance on estate records can, however, impose considerable limitations on the research themes that can be pursued. It is therefore important to consider the cause and effect of the limitations resulting from a documentary-based approach to woodland history which principally relies on estate records. These occur at three levels. At a general level, estate papers, and indeed any archival and manuscript material, pose the problem of deciphering and interpreting them. Thus, the palaeographical obstacle provided one factor limiting the chronological scope of this study to post-1650. Perhaps the most difficult aspect of using documents, once words have been deciphered, is their interpretation, for meanings of words change over time. For example 'hagg' which had the very precise meaning of a division of coppice for cutting in one year. Estate papers are also frequently ambiguous; and it cannot be discounted that some documents were intended to deceive someone other than the researcher. Consequently all evidence must be carefully assessed for its precise significance.

Equally, the purpose of the information carried within these documents was not to convey general information about agriculture and the rural economy, but rather it was a means of communicating and accounting for matters of estate policy and administration. Consequently, much of the incidental evidence that the modern researcher can glean from the documents is not wholly relevant to the original purpose. One illustration of this is the often found remark or note in pencil in the margin of a factor or woodkeeper's report which can reveal the proprietor's frustrations at his agent's ineptitude or oversight which might otherwise go unrecorded anywhere else in the estate papers.

This unawareness of who might read these papers in the future also unfortunately means that difficulties arise with place names, and the frequent interchangeability which occurred with regard to them. One substantial oakwood on the south side of Loch Tay, for example, was referred to as Firbush Park in the 1769 Survey of Lochtayside, and yet that name does not appears to have been used in, for example, wood reports and surveys of Lochtayside throughout the period; rather many references appear to a wood named Parcnacloich which is not depicted on the 1769 survey but which matches the size and location of the Firbush Park of the 1769 survey (RHP 974/1-2). It must be surmised that these two names are in fact referring to the same wood, which was known by two different names.

Estate papers are also often very fragmentary, allowing only snatched glimpses of the decision-making process, which can sometimes result in uncertainty about whether some decisions were carried through. Again this leaves the interpreter with difficulties inferring from the pattern of subsequent events what were the nature of some decisions. Consequently any interpretation of documentary evidence is open to challenge/dispute. Nevertheless, documentary evidence from estate archives are generally free of the sorts of bias of many of the published primary sources as discussed in the previous section, and as such are essentially factual records of estate management, although seen only top-down, from the management side.

Indeed, one of the fundamental drawbacks of relying on estate papers is that they principally and inevitably depict a one-sided view of society, that of the landowners. There exists, in the documentary evidence, little detail regarding the tenantry's opinions and preoccupation's, and even less on the subordinate cottars and servants. Where their voice is heard, in petitions, courts books and occasionally second hand in the reports of estate agents and employees, it is generally the voice of concern and disgruntlement. These documents undoubtedly provide a valuable insight, but these can be highly coloured, and were the written interpretation of people who were illiterate, naturally spoke a different language to the one employed in documents, and who based their communications on an oral tradition. It is unfortunate that this oral tradition, which might have revealed more about Highland rural life, is now largely lost, and what does remain has generally been disregarded as lacking academic credibility by some English-speaking historians.

Although it would undoubtedly be preferable to have access to the views and experiences of the tenantry with regard to woodlands and their forms of utilisation, nonetheless it is clear that during the period under investigation, the

tenantry became consistently more estranged from this resource, and essentially retained little or no control over the woodlands in their locality. It is therefore less of a handicap for the woodland historian than, for example, the agrarian historian, not to have access to the voice of the tenantry, as the proprietor had always the most influence and control over decisions regarding woodland utilisation on his lands.

Consideration, on a more specific level, of the efficacy of estate records for woodland history research highlighted, in addition to the limitations already discussed on a general level, a number of particular problems. Lindsay found that the fragmentary nature of estate papers means that examining systematically the measurement of the amounts of timber and other woodland produced utilised is problematical, particularly in recording local usage (Lindsay 1975a, 41-44). Where such records exist in a more systematic form is during the period of agricultural improvement when record keeping on estates significantly increased. That is not to say that utilisation of the woodland resource in pre-Improvement Highland society was not commonplace, rather it was simply less visible in a period when it was of less economic significance to those who controlled the resource.

Lindsay also highlighted the danger of using documentary evidence extracted from estate papers to make generalisations about woodland history because of the localised nature of the evidence they contain, and also because of the problem of relying on evidence from estates where there is a good deal of information on woodland management, as they may not represent the level of woodland management elsewhere, only the enthusiasm of a particular landowner (ibid.). If it is accepted that the Earls of Breadalbane were among that group of landowners, including the Dukes of Atholl, who in the late 18th and 19th centuries were leading the way in the development of forestry, then it would be unwise to draw from the conclusions of this study any broad generalisations regarding Highland woodland utilisation and management; rather, as originally flagged by Lindsay, the evidence relating to woodland management on the Breadalbane estates in Perthshire could help provide solutions to some of the aspects of the use of woodlands in Perthshire which still remain obscure (Lindsay, 1974: 675-676). In particular, by examining the documentary evidence from estate records of a single contained geographical unit, supplementary evidence can be added to help determine the degree to which the character of coppice management was regionally differentiated, a problem previously examined and discussed by Lindsay for other parts of Perthshire and Argyll (ibid., 460-463).

Given all of the above mentioned limitations to the application of estate records for research in historical geography and woodland history, it is also important to examine specific problems encountered at the level of individual Muniments. The Breadalbane Muniments, as already noted, is largely contained within the Scottish Record Office, Edinburgh. This collection, which relates to the Campbells of Glenorchy, is regarded as one of the finest in Scotland. It contains documents dating from 1374 until the 1920s, and is particularly important for 16th, 17th and 18th century material (Bil 1996, 3). Until fairly recently the papers remained uncatalogued, a situation which placed a significant obstacle in the way of researchers who wanted to utilise the Muniments, particularly if they were confined to specific subject matter such as woodland history. A number of historians had nevertheless examined the collection prior to the compilation of the catalogue. Foremost among these was the Rev. William Gillies, Minister for Kenmore parish at the time of the break-up of the estate, who took 26 years to research and write the most comprehensive history of the district of Breadalbane (Gillies 1938). Others who have examined the Breadalbane Muniments were either concentrating on a specific area of search, as with MacArthur's excellent introduction, and transcription of, the 1769 Survey of Lochtayside, or as with Gray's work on the Highland economy with its much wider remit, which extracted a small number of documents from the collection to help substantiate research based on a more extensive range of documentary sources (MacArthur 1936; Gray, 1957). Therefore, given the great size of the collection, it is easy to understand why so little work had been based on this substantial documentary source prior to cataloguing. It may be for this reason that Lindsay, when undertaking his research on the woodland of Perthshire and Argyll, largely avoided detailed examination of these papers (Lindsay 1974).

Even after completion of the catalogue, there still remained problems. Foremost amongst these is the scale of the collection, for while it is a vast source of information which brims with possibilities for research, that very vastness requires time to sift through the copious slips of paper, many books and abundant documents, despite the invaluable referencing of the catalogue.

There are, in fact, 74 sections to the catalogue which are grouped into 14 subject areas which range from the earliest titles to land, to extensive estate papers, public affairs papers, ecclesiastical and military papers and include documents relating to all the land and states which have been at one time or another under the control of the Campbells of Glenorchy. Within many of the sections of the archive, there can be up to several hundred bundles of documents grouped into different sub-sections according to subject matter and chronology; in turn, each bundle can

contain over 100 individual documents, although the larger bundles of documents usually contain only scraps of paper bearing, for example, vouchers and discharges. It is not surprising therefore that a review of sections and sub-sections in the catalogue, and a document search of the archive itself, can be extraordinarily time consuming.

For the purposes of this study, a limited number of relevant sections were initially focused upon within the estate papers grouping, in particular, Sections 9 to 18 where the most apparent references to woods appeared to be. These included rentals, tacks, petitions, estate improvements, marches, factor's accounts and reports, local courts, mines and minerals, and a miscellaneous section. Fortunately, both Sections 15 and 16, 'Vouchers and Factor's Accounts' and 'Miscellaneous Papers' respectively, contained sub-sections relating specifically to woods. These two sections therefore proved to be the most fruitful for this study, but inevitably could by no means yield sufficient information to tell the whole story of the utilisation and management of Lochtayside's woodlands during the period under examination. In addition to examining the above-mentioned sections, a less rewarding period was spent searching for relevant documents relating to woodlands in other sections.

The size of the collection also resulted in some implicit problems. It would be impossible for the archivist who undertakes to compile such a catalogue to summarise the content of each individual document. Consequently, there is a certain reliance on the judgement of the cataloguer, for that person must decide what items are to be summarised in the catalogue which will be sufficiently representative to indicate to the researcher whether a bundle is likely to contain relevant information. It is not inconceivable therefore that, for whatever reason, the cataloguer of the Breadalbane Muniments omitted certain woodland references from the catalogue. It was not possible to determine from the relatively limited examination of the Breadalbane estate papers undertaken for this study, whether such an assumption is correct, and therefore whether omissions were significant enough to cause a problem for such research. Sufficient detail on the woodlands of Lochtayside was, in any case, extracted from the Muniments to enable a good insight into the events, processes and factors affecting them to be achieved. Indeed, some very important papers relating to woods were discovered during the period of research.

Two further, associated problems became evident from an examination of the Muniments and their catalogue. Firstly, while some sections contained sub-sections indicating documents relating to woods, other sections which on the face

of it seemed unlikely to contain references to woods, on the contrary, did include useful woodland related information. Thus, Section 20, which is titles 'Houses and Buildings', contained a bundle of four items, all of which specifically related to the sale of woods and trees in the early 19th century (GD 112/20/3/3). If this is representative of the whole catalogue, then it might be assumed that other bundles also exist in sections not otherwise assumed to contain woodland references. A complete search of almost all 74 sections would be required to uncover other such references; a task which was not possible in the circumstances.

Secondly, there was seldom any geographical differentiation within sub-sections which meant that a bundle might contains documents relating to Lochtayside, other Perthshire districts, as well as Breadalbane's Argyll properties. Equally it might appear that a bundle contained documents relating only to Argyll woods, but because not all individual items are described, some of these papers were found to also contain information on Lochtayside. It was judged, therefore, that while an assessment of appropriateness of a bundle should be made according to stated content, this did not automatically rule out examination of important woodland bundles apparently solely relating to Argyll. This also allowed an opportunity for comparison to be made with the treatment of woodlands in Argyll, and an exploration of Lindsay's suggestion of regional differentiation in coppicing in Scotland, since Argyll was perceived to be affected by a different set of factors to those affecting the Lochtayside area, resulting in a different form of utilisation and management (Lindsay 1974, 460).

The problem of locating relevant material in such a large archive is probably ubiquitous in documentary research, and indeed it is likely that the Breadalbane Muniments are one of the better catalogued collections. An exhaustive search of such a large collection was not within the bounds of possibility. It would be appropriate to regard this study as a scoping exercise, largely based on estate records, which was able to demonstrate the enormous potential, not only for future detailed work on woodland utilisation, and for other related subjects such as plantation forestry, seed sources and nurseries, and within a wider geographical are of Perthshire, but also for more extensive study of other aspects of the historical geography of Highland Perthshire. There is also potential to link the current ecological status of the woodlands with their past management history, a topic which has been briefly examined and will be discussed later.

One of the most striking disparities between the content of the woodland related papers for Argyll and Perthshire was the almost total lack of wood contracts for Lochtayside compared to Argyll where very many wood contracts have been

unearthed (per. com. F Watson). So far, only two wood contracts have been identified in the Breadalbane Muniments relating to the immediate vicinity of Lochtayside. The earliest of these is from 1723, and related to the sale by roup of the "birkwood of Lochy, Craig" in Glen Lochay, a feeder glen to the north west of Loch Tay, where six probably local men purchased the birch in the wood over a three-year period (GD 112/15/186). A series of papers was also uncovered relating to the survey and sale of the majority of woods on Lochtayside in 1787, including copies of the articles and minutes of the roup, and a contract for the purchase at the roup of the major part of these oakwoods for eight years, by three men from the Strathearn area (GD 112/16/11/2).

To digress slightly, and with reference to a point made earlier, even with access to these documents, a number of obstacles arise in their interpretation. For example, it is not always possible to identify where purchasers came from, even with place names given, for as already demonstrated, place names often changed or settlements disappeared. Thus, Portmore was given as the residence of one of the purchasers in 1787. Following investigations, two possibilities for its location were identified; a small settlement in Peeblesshire, and the old name for St Fillan's in Strathearn, the latter being more likely (per. com., A Bil). Also it is rarely possible to establish the purchaser's station in life, unless he is titled, but "Coline Campbell of Lochlan" as one of the purchasers was referred to in the 1723 contract and was likely to have been a gentlemen in possession of a tack of land. Moreover, there is seldom any indication of the exact occupations of these wood buyers, although it has been suggested that, in this part of Perthshire at least, this tended to be a sideline of local farmers (Lindsay, 1974, 438).

Returning to the lack of wood contracts, although there exists in the estate papers numerous documents referring to the sale of woods by roup, individual purchasers of wood produce by tenants, timber provided *gratis* for housebuilding, and enclosure of woods, the scarcity of actual wood contracts, which normally set down any conditions of sale and therefore can be enormously revealing about the treatment of woods, left an unfortunate gap in the evidence. If these exist they could greatly assist the understanding of the treatment of Lochtayside woods during this period.

It is not clear why wood contracts apparently do not exist for the Lochtayside woods. Whether they simply never existed at all, and all woodland produce was sold and used locally, unlike in Argyll where many of the Earl of Breadalbane's woods were destined for the Lorne Furnace Company's, 'Bunawe' furnace (Lindsay, 1974; several documents in GD 112 refer to dealings with this

company), or whether they remain undiscovered, either within the Breadalbane collections itself, or in the collections of the Earls of Breadalbane's agents and business associates collections, remains an enigma. Some possible locations for material relating to the Breadalbane estates can, for example, be found in Campbell of Achallader papers, Campbell of Monzie, MacGregor Muniments (GD 50), the Barcaldine Muniments (GD 170), and it may be possible that papers exist in some merchants' papers which would clearly be very difficult to pinpoint. A search has been undertaken for wood contracts in the Register of Deed, but this, on the face of it, likely source, has not yielded contracts relating to Lochtayside woods (per. com. T C Smout).

It is possible, though unlikely, that the contracts were destroyed either by accident: for example, there was a fire in the estate office at Bolfracks which is said to have destroyed a large amount of records, or intentionally destroyed as a result of estate reorganisation (Bil 1996, 3). Furthermore, it is not inconceivable that, following the break-up of the Breadalbane estates, which was not a single event, some papers found their way into private hands (ABC Comment, 1996). It is certainly known that at least a plan and account of the lands on the estate around Aberfeldy were retained by a former business associate of the estate.

Whatever the truth about these wood contracts, their absence does impose some limitation on the interpretation of the history of Lochtayside's woodlands. Neither are these the only pieces of the jigsaw that are missing, which if unearthed would greatly enhance an understanding of the district's woodland history, and the relationship between factors affecting regional differentiation of utilisation and management, particularly their commercial exploitation. There exist within the collection some tantalising morsels of information regarding the local production of charcoal, the sale of bark and timber outwith the locality, and the proposal for production of pyroligineous acid on the shores of Loch Tay. Further evidence to substantiate and expand upon this information was not, however, found; the reason for which could again be any of those already postulated with regard to wood contracts.

Nevertheless, the search for useful documents within the Breadalbane estate records relating to the woods of Lochtayside has yielded a significant amount of information, particularly in the form of estate memoranda, surveyor reports, woodkeeper reports, account of local sales of timber and bark, and accounts for enclosure of woods. It would have been rather exceptional for a complete range of documents to have emerged which would have allowed this particular jigsaw to fit together. As it is, what has emerged should allow a useful preliminary history

of the utilisation and management of Lochtayside's woodland to be made, incorporating some informed speculation where gaps in evident are apparent, and at least, enabling some tentative conclusions to be drawn regarding the processes operating in the district which resulted in the unique development of the utilisation and management of its woodland resource. These conclusions can also be ably supported by utilisation of the cartographic source material which exists for Lochtayside.

Cartographic Sources - Early Maps to the Ordnance Survey

Cartographic sources have been recognised as providing a unique fund of information for historical geography in Scotland, allowing an important, if rather too infrequent, spatial perspective of the Scottish landscape. As such, maps and plans have been used extensively by researchers in their investigations of various aspects of the Scottish landscape, both urban and rural. They have proved particularly useful in settlement studies, but also in work on land use such as the extent of enclosure and arable land, and in localised case studies (Moore 1991).

With regard to woodland history, the cartographic record is undoubtedly of great potential value, and indeed such sources have been employed to varying degrees, both for providing evidence for the extent and distribution of woodland in a particularly locality at different times, and for estimating the historical and present-day extent and distribution of woodland over the whole of Scotland (Lindsay 1974; Cheape 1993, Smout 1993; O'Dell 1953; Roberts et al 1992).

It has been pointed out by Whittington that the value of any historical source is derived not only from its scope and content, but also from its accuracy and consistency (Whittington, 1986, 7). It is clear therefore, that while historical cartographic evidence can greatly enhance the understanding of the past nature of the Scottish landscape, its application to historical research cannot be accepted uncritically. It has not always been fully appreciated by historical geographers and others, that face value reliance on a particular map or suite of maps, without analysis for reliability can lead to conclusions based on misleading evidence.

It is therefore the intention of this section to outline the cartographic sources available for Lochtayside, and critically evaluate their appropriateness for depicting the extent, distribution, and composition of the woodlands of this district. In particular an assessment will be undertaken by comparative analysis of the Military Survey of Scotland (1747-55), using contemporary estate plans, and with reference to other cartographic sources. In addition, spatial and

temporal changes in the woodlands of Lochtayside will be investigated using the 1769 Survey of Lochtayside, the 1st edition Ordnance Survey (OS) from the mid 19th century, and the current OS maps of Lochtayside.

The Early Maps of Scotland

The earliest mapped material available, as sources of data for Scottish landscape change, comes from the national surveys conducted by Timothy Pont and Robert Gordon, the Blaeu Atlas, largely derived from Pont, in the late 16th and 17th centuries, and the later and less comprehensive maps of John Adair from the turn of the 17th century. These early small-scale maps, particularly the manuscript maps of Pont and Gordon, are generally difficult to interpret as they are sometimes not clearly legible; their content, particularly with regard to woodland, has not been completely analysed; their scales are not clear; and what area they are locating is not always clear. Nevertheless, a considerable body of work exists based on these early cartographic sources, and much discussion has taken place, particularly regarding authorship and chronology of the portrayal of landscape recorded on the manuscript maps of Pont and Gordon, held in the National Library of Scotland, and their later derivatives (Moore, 1991). In particular, Stone has carried out detailed analysis of this cartographic source, including an analysis of each individual map produced by Pont and Gordon (Stone 1989).

Perhaps because of the difficulties associated with establishing authorship, gaining access to the maps and interpreting their content, prior to Stone's recent analytical work, woodland historians have largely avoided this early potential source of woodland information, although Anderson, in his meticulous history of Scottish forestry, referred to written notes and reports attributed to Pont in Macfarlane's Geographical Collections (Anderson 1967, V1, 192, 197). Interest in the Pont maps as a source of woodland history, however, has developed more recently, most probably because they provide the earliest maps on a scale large enough to be useful in identifying woodlands in the 16th century landscape, but equally due to their greater accessibility with their reproduction in Stone's recent publication (op.cit., 1989).

In any analysis of cartographic sources, it is important to be aware of the surveyor's/map maker's objectives and, as Stone has pointed out, for Pont the emphasis was clearly on the portrayal of man-made features, notably in locating settlements (Stone 1989, 10). Yet although natural features are fewer in total, the range is wide and includes rivers, burns, hills, lochs, and woods. There is evidence, however, that woodlands were not systematically recorded by Pont,

although some appear to have been deliberately recorded, and even named; a useful occurrence which can facilitate verification using contemporary sources such as Macfarlane's collections, and later maps. It is not clear why some areas of woodland should have been deliberately marked and named, but given the relatively small scale of the maps, and apparent priority given to human habitation, it may simply be the case that woodlands were only marked if they were perceived as being important and where space was not taken up by settlement names and symbols.

On the question of the use of locational symbols, Stone has suggested that Pont did not use this cartographic tool with the consistency which is considered appropriate today. Nevertheless there exists in these maps a rudimentary sense of convention which enables the modern-day researcher, who is more familiar with precise conventional symbolisation, to pick out the key features of the landscape being portrayed by Pont (ibid.). It is noteworthy, however, that Stone has cautioned that the use what might appear to be conifer and broadleaved tree symbols must not necessarily be taken as indicative of woodland type, and this will be discussed further later in the section (Stone 1996, SWHDG conference).

Stone has commented that the later drafts derived from the original Pont manuscript maps, such as those of Robert Gordon of Straloch, his son James Gordon of Rothiemay, and those published in 1654 in Blaeu's Atlas of the World, provide less convincing evidence. He has suggested that Pont should therefore remain the primary source and that the later derivatives should be examined only after consultation of the Pont maps or where there is no extant map by Pont, except in the north-east lowlands, where the Gordons' home was, and therefore where they might be expected to have been able to produce additional first-hand information (ibid., 9).

Among the 38 sheets of manuscript maps attributed to Pont and held in the National Library of Scotland, Edinburgh, is a map showing the whole of Lochtayside (Figure 4). Stone, in his analysis of this map, referred to as 'Pont 18: Loch Tay; the head of Glentanar', suggested that someone seemed to be particularly interested in this map for they had separated it from the other maps on the sheet (ibid., 107). Why this should be remains a mystery, and there is no way of telling if the separation of the Loch Tay map from the larger sheet (Pont 7) was the work of Pont himself, or of one of the several subsequent holders of the collection.

Pont 18 portrays a reasonable general representation of the morphology of Loch Tay, and employs various symbols for locating man-made structures. The drainage pattern is perhaps the next most noticeable physical feature of the map. Indeed, the many burns running into Loch Tay are grossly out of proportion to their actual size; a device which, as Stone has postulated for 'Pont 23 - Garry, Tummel and upper Tay', may have provided a framework for the location of detail. Alternatively the burns, like the loch itself which is also out of proportion in width, may have been seen as an important enough physical feature, enough certainly to merit a note on the map indicating "the burnes falling in Loch Tay ar steep & glennish" (ibid., 108).

Stone's analysis identified 75 named places, mainly settlements such as 'Lawers' and 'Keand-moir', but also physical features such as Loch Brekalach, 'Glenlochay', 'Drummyn Hil', and including two named woods, 'Letyr yllen' and 'Letyr ardeunaig' (Stone per.com.). For anyone studying toponomy the Pont collection contains a wealth of information, although it is not clear whether Pont could speak Gaelic and therefore if he accurately reproduced some of the names. While several of the names are difficult to identify many are, however, consistent with later maps, and indeed relate to current place names.

Despite the good correspondence of place names, the general similarity in morphology of the loch and positioning of major burns, there are many inaccuracies to be found in the way Pont depicted Lochtayside. The eastern half of the loch, although not entirely corresponding in width and alignment, nevertheless bears a reasonably good resemblance to the physical reality. It is, however, almost as if the western section has been squashed lengthwise, resulting in much cramming in of various features, and an inaccurate positioning of burns. In this respect, most noticeable is the lack of correspondence between the north and south sides of the loch. Thus, the Allt Breaclaich flows into Loch Tay opposite Kiltyrie on Pont, whereas in reality it is opposite Morinish, while the mouth of the Ardtalnaig burn is opposite the old village of Lawers beside the Lawers burn, whereas Pont has placed Lawers further to the west.

Perhaps most intriguing, however, is the lack of correspondence between the west end of the Loch on Pont and its current layout. Pont depicts the River Lochay entering directly into Loch Tay, and a large island just offshore, whereas all subsequent maps up to the present, adhere to the current course of the Lochay which joins the River Dochart just before it enters the loch. There are two possible explanations for this anomaly. Either Pont did not actually travel the whole length of the loch, and therefore simply drafted his map from second-hand

information. This might also explain the inadequate portrayal of aspects of the western half of the loch, compared to the eastern half. Alternatively, it is just possible that the Lochay has indeed changed course since the late 16th century as there exists a relatively extensive floodplain, including an oxbow feature, on either side of the Lochay, and the Dochart at their mouths. In fact, Farqhuarson noted in his 1769 survey of north Lochtayside that on Finlarig the low ground appeared as if "a part or the whole of the River Lochay had once run thro' it" (McArthur 1936, 4) In addition there is some evidence from 19th and 20th century maps to suggest the development of offshore islands. Such an hypothesis, however, could only be supported with the aid of geomorphological expertise.

Having established that the Pont map of Lochtayside provides a reasonably credible portrayal of the environs of the Loch, the degree to which the representation of woodland may be judged valuable for a woodland history study, now needs to be assessed. On this particular Pont map (but not all) woodlands are depicted using tree symbols and, as Stone has pointed out, Pont took great care in drawing these symbols on the lower slopes of the surrounding hills (Stone 1989, 107). These symbols are neither uniformly located around the loch, unlike some later maps of a similar scale, but rather give the impression of being carefully placed, nor are they all exactly alike, some being more like broadleaved trees, and other being slightly conical, perhaps indicating conifers.

If the conclusion is reached that Pont had attempted to differentiate between broadleaf and conifer and, that within the limitations of scale, he had mapped as accurately as possible the distribution of woodland on Lochtayside, then the Pont manuscript maps must be regarded as potentially making a significant contribution to the understanding of the extent, distribution and composition of woodlands on Lochtayside, and perhaps this would apply also to other parts of Scotland mapped by Pont.

There are, however, several problems with such a conclusion. With regard to tree symbols, there is no evidence to suggest that Pont differentiated between conifer and broadleaved woodland and, as previously noted, there is a view that the variation in symbolisation is not indicative of differentiation of woodland type. On the contrary, since it has been shown that there is also variation in other locational symbols, the variation in tree symbolisation is simply consistent with Pont's rudimentary conventionalism (Stone 1996, SWHDG conference).

One form of evidence which might support a distinction of woodland type in the Pont maps could be provided by contemporary or later documentary accounts of

woodland composition, as also could some forms of field analysis. Since pinewoods, in the historic period, appear to have been a minority woodland type in Scotland, evidence, either documentary or field-based, to support the existence of a pinewood in a particular location which has been depicted on Pont using the 'conifer' symbol might counter Stone's assertion. On the Lochtayside map, the 'conifer' symbol is most apparent on the west side of Allt Breaclaich. Today, conifers are certainly present on this site, but they are the non-native sitka spruce of recent commercial plantation origin. Later maps from the 18th century do not support the presence of a pinewood, but rather depict the burn skirted with ash and birch, with oak and alder to the west (RHP 974/1-2). The one possible site of a pinewood identified using other cartographic and written sources is on the hill behind Finlarig; however, Pont has not marked any tree symbol in the vicinity of Finlarig, despite the fact that there would have been space to have done this, owing to infrequent places named thereabouts (RHP 973/1-2). Indeed, if one accepts the earlier contention that Pont did not map the west end of the Loch in as much detail as the eastern portion, then the lack of tree symbols north of Finlarig, and up Glenlochay would be further support for this, since it is known that there was extensive woodland both in Glenlochay and around Finlarig.

On the subject of how accurately Pont portrayed the distribution and extent of woodland on Lochtayside, again, corroboration from contemporary and other documentary and field-based sources is required. In considering the depiction of woodland on the south side of the loch, it is apparent that Pont has drawn tree symbols intermingled with settlements, and other named places, including, as already noted, the deliberate recording of a woodland by name. This would suggest that woodlands were quite widespread along the south side of the loch, in juxtaposition with settlements. Later cartographic and written evidence, and to an extent the current distribution of woodland on this side of Loch Tay, would support this premiss.

There is nonetheless a curious empty space at the south western most corner of the lochside, by the mouth of the Dochart. This may be accounted for by damage to and/or fading of the margin of the map, or it might again be explained by Pont's lack of knowledge of the west end of the loch. Either or both explanations are plausible, but according to Macfarlane, a report attributed to Pont that, "A myl (from Achamoir) thence Innerokehirt with a great wood of oak, heir Dochart entereth in Loch Tay" (Macfarlane's Geographical Collection quoted in Anderson, Vol. 1,1967; 192), would suggest that he may well have travelled through this area, or at least if he was aware of the wood, it would surely have been recorded on his map of the area.

Stone has suggested that Gordon both amended this map, and also retouched the original faded work (Stone 1989, 107). Consequently, it would be expected that if there had been symbols or annotations recorded by Pont on this south west corner, they would have been touched up later by Gordon. A tentative conclusion might be that Pont did not, at least at the time of drafting Pont 18, have sufficient knowledge of this area to be able to record information about this woodland, and only became aware of the presence of this great oakwood, which almost certainly existed, at some later date, or indeed Macfarlane wrongly attributed this report to Pont.

With regard to the north side of Loch Tay, the impression gained from Pont 18 is that more woodland was present east of Lawers rather than to the west of it, and it is here that the second of the two named woodlands is located, 'Letyr yllen' (Letter ellan). Certainly there is evidence to support woodland in the locality, now generally referred to as Drummond Hill; however, later cartographic sources, in particular the 1769 Survey of Lochtayside, and documentary evidence resulting from the current study, suggests that in contradiction to Pont's portrayal of extensive woodland up the eastern slopes of Ben Lawers, woodland was, in fact, most abundant along the lochside west of Lawers, and that by 1769, there was very little woodland on the south east slopes of Ben Lawers, only bushy meadows, scattered alders and lochside planted ash trees, certainly not significant enough for Farquharson to classify as woodland (RHP 973/1-2). It may be suggested therefore that either there was extensive clearance of woodland for cultivation between Lawers and Fearnan between the late 16th and mid 18th centuries, accompanied by extensive planting to the west of Lawers, and as far as Finlarig, or alternatively Pont did not have sufficient information about the distribution of woodland along the north western shores of the loch.

Nevertheless, it must remain a possibility that the area between Lawers and Fearnan supported, at the end of the 16th century, extensive areas of woodland, possibly dominated by alder as a number of place names derive from alder. As rural society emerged from a period of plague and political turmoil, perhaps even despite these potential checks on the evolution of agriculture in 17th-century Scotland, the continuing process of 'death by a thousand cuts' so familiar to woodland history, resulted in a continuing diminution of the woodland resource on Lochtayside, leaving only bushes, scattered alders and a few lochside ash by 1769. Today the lochshore is nearly bare, and the hillside bears the inevitable straight-edged conifer plantation (Whyte 1979, 2-3, 257).

The foregoing section has considered the value of the Pont manuscript maps for a woodland history study through focusing on one of the manuscript maps. From this, two principal conclusions have been arrived at. Firstly, while there remain many issues to be clarified regarding the extent of Pont's cartography. Subsequently there are some limitations which must necessitate a cautious approach to the interpretation of the material. Nevertheless, Pont's work provides a unique source of information, and as such should be considered as an important primary source for historical geography.

With regard to the later derivatives, an examination of these for Lochtayside revealed no additional information, and indeed the map printed in Blaeu's Atlas, which covers Lochtayside, depicts no woodland at all on Lochtayside. This would therefore support Stone's advice that these should only be examined after the Pont source has been consulted, or where there is no extant map by Pont.

Secondly, although a considerable amount of valuable research has already been undertaken, further research on the depiction of woodland on Pont is necessary, supported by contemporary documentary research in order to clarify many issues which have emerged from this limited analysis; not least among these is the apparent variation in the use of tree symbols. Such a conclusion would suggest that a detailed analysis of the depiction of woodland on all the Pont collection and its derivatives would be justified.

18th and 19th Century Sources - From Roy to the Ordnance Survey

The Pont manuscript maps stand out as an important early cartographic source, not only of woodland information, but also of the patterning of the Scottish landscape in the late 16th century. It was not until over a century later that any comparable national survey was undertaken which might increase the understanding of Scottish woodland history. In fact, the Military Survey of Scotland (1747-55), or as it is more commonly known, the Roy Map, was the product of the first systematic survey of mainland Scotland. It was instigated to assist with the pacification and opening up of the Highlands, following the Jacobite Rebellion of 1745, with the initial two seasons of survey work being carried out by William Roy, then a civilian draughtsman working for the Ordnance Office in Edinburgh. Roy, later to become a Major-General in the British Army, was assigned sufficient military personnel in 1748 to be able to send out six survey parties and completed mapping the Highlands in 1752; thereafter, with a reduction to two survey parties, the survey of the south of Scotland was completed in 1755 (O'Donoghue 1977).

The result of this ambitious project was initially a series of manuscript maps, at a scale of 1 inch to 1,000 yards, known today as the Protracted Copy. From this copy of the survey north of the Clyde-Forth line came a reworked fair copy employing colour wash to enhance its appearance, and a set of similar styled maps derived from the southern Scotland survey material. Together these maps later came together to form the Complete Fair Copy. Both the Protracted and the Complete Fair Copies are preserved in the British Library in London; however, the Complete Fair Copy is by far the most accessible, with photocopies being held in the National Library of Scotland, and in some district libraries.

Consequently it is the Fair Copy which is the source most often consulted by researchers, and has been generally accepted as one of the most important early cartographic records of Scotland (Whittington & Gibson 1986; Moore 1991; Skelton 1967; O'Dell 1953). As such, it has been extensively used in historical geography studies as a record of the Scottish countryside in the mid 18th century, offering a view of the pre-Improvement landscape of the Highlands, and a glimpse of the Lowlands where the first effects of agricultural improvement were beginning to alter the patterning of the countryside (Whittington & Gibson 1986; Whyte 1991, 53).

More recently, however, the reliability and accuracy of the Roy Map, particularly as a source for various landscape features and their spatial relationships, in respect of settlement, cultivation and roads has been questioned. Indeed, Whittington and Gibson expressed surprise that the Roy Map had not been subjected to a thorough evaluation for its general reliability as a historical source, particularly in terms of its consistency and accuracy. They therefore proceeded to undertake a systematic examination using comparative analysis on a thematic basis which covered a range of features of the human landscape, in both a Highland and Lowland, rural and urban setting (Moore 1991, 34-36; Whittington & Gibson 1986; Whittington 1986).

Basically this methodology involved an initial comparison between the Protracted and Fair Copies of those categories of information depicted on the maps singled out for analysis. On the whole, their findings suggested that the Protracted Copy is more reliable than the Fair Copy. The second stage was to compare carefully the Roy Map, both Protracted and Fair Copies, alongside contemporary plans for these same elements of the landscape. This analysis revealed major discrepancies between some aspects of the Roy Map, particularly the Fair Copy, and the equivalent coverage on a comparable contemporary plans. With place names, some variation was shown to exist between the Protracted and Fair versions, with

the former taken to be more reliable than the latter. Furthermore, a large number of place names were missing from the Roy Map, and it appeared that Roy's surveyors had difficulty reconciling the prevalence of split townships.

The study also showed that the levels of accuracy for settlement location were reasonably good, especially for larger settlements, as was their general morphology, but the depiction of fermtouns was found to be problematical, with the Protracted Copy again seen as being the more reliable of the two versions. Perhaps of more relevance for the current study were the findings of the analysis of the distribution and extent of cultivated land at the district level, in Fife (Whittington 1986). This suggested that the representation of cultivated land was purely symbolic, and therefore only a general impression of its extent could be gleaned from the Roy Map. Moreover, it was suggested that as the Fair Copy had been consistently shown to have exaggerated other features examined, and the depiction of cultivated land bore little resemblance to what appeared on the Protracted Copy, any evaluation of cultivated land should not be based on the Fair Copy. This conclusion was in marked contrast to some previous studies, such as O'Dell's work, which had included the reconstruction of the distribution of farmed land in Scotland based on the Fair Copy (O'Dell 1953).

It is generally assumed that since Roy's survey was undertaken for strategic and military purposes, Roy and his military engineers would have paid particular attention to those features of terrain and cover which were likely to advance these objectives, and that the final product would therefore reflect this perspective. It would be expected therefore that such features as woodland, long viewed as a refuge for outlaws and rebels, and roads, key to the rapid deployment of troops, would be regarded as essential features to be located accurately on a military map. Some researchers have, however ,questioned the rationale behind the survey, suggesting that accuracy was intentionally subordinated to appearance, and there is some evidence to suggest that the accuracy of the depiction of the road system was not very good, with key roads being excluded from the map. Indeed Roy, 30 years after the completion of the survey, perhaps slightly defensively suggested "it is rather to be considered as a magnificent military sketch than a very accurate map of a country" (Roy 1785 quoted in Whittington & Gibson 1986, 10).

The conclusions of this important study suggest that any attempt at utilising the Roy Map for analysis at more than a general level would be imprudent, and it would be more sensible to seek out an alternative in the first instance. Nonetheless it was viewed as accurate enough to justify its careful exploitation, but that both

Protracted and Fair Copies would be best examined together, and the inherent limitations of detail should be acknowledged. (ibid.).

All of the above considerations regarding the reliability and accuracy of the Roy Maps for historical geography studies have important and far-reaching implications for its use in the study of woodland history, and in particular in the reliance on it for determining the extent and distribution of woodlands in the mid 18th century, at more than a general level. It is clear that further investigation on those aspects which have been neglected including the accuracy of the road system, particularly in the Highlands, and the depiction of woodland, is long overdue.

Historical geographers writing about the Scottish rural economy and landscape have tended to neglect the role of woodland in its social, economic and environmental evolution. Why this should be is not clear. It may be founded in the lack of an interdisciplinary approach to woodland history, resulting in woodlands being regarded as belonging to the domain of the ecologist, forester, and archaeologist, or perhaps it is that woodlands were not perceived to impact sufficiently on society and the economy to warrant in-depth investigation (Smout 1993, *xii-xvii*; Callander & MacKenzie, in press; Dickson 1992; Tipping 1993). Whatever the reason, only a few notable exceptions have attempted to evaluate that role, but even these workers, if using cartographic material at all as a source, have often neglected to evaluate the reliability of the cartographic sources they have exploited to support their argument. Thus the utilisation of the Roy Map as a tool in the study of landuse history has generally involved the use of the Fair Copy to delineate the extent of woodland cover as part of a wider examination of the processes and factors affecting their historical development in the Highlands, or to support arguments regarding the effects of other land uses on woodlands, without adequately evaluating the reliability of it as a source (Lindsay 1974; Cheape 1993; Anderson 1967; Mather 1993).

If the conclusions reached by Whittington and others are found to apply equally to the portrayal of woodland on the Roy Map, then the aforementioned body of work, which has rarely acknowledged sufficiently its limitations, or attempted to utilise the original Protraction, may be based upon a serious overestimate of its value, resulting in the formulation of inherently flawed conclusions. Above all, serious doubts must be cast upon the reliability of the 'Inventories of Ancient Woodland' in Scotland undertaken by the former Nature Conservancy Council (now Scottish Natural Heritage). This was based on the study of historical map sources which used in particular Roy's Fair Copy to identify sites of 'ancient' semi-natural and

plantation woodland. It has also provided the basis for the formulation of current woodland policies and practices in the forestry, planning and nature conservation sectors (Walker & Kirby 1989, 45; FCb 1995).

It was therefore regarded as essential that this section should attempt to address some of the gaps in the understanding of this relatively poorly understood source for woodland history, in order to both to evaluate it as a source for determining the distribution and extent of woodland on Lochtayside in the mid-18th century, thereby facilitating an understanding of the management history of these woodlands, and as a contribution to the existing work undertaken on the reliability of Roy.

The methodology was based on comparative analysis as employed by Whittington & Gibson. Thus a comparison was made, firstly between the Fair and Protracted Copies covering Lochtayside, and then with a contemporary estate plan (Figures 5 & 6). The justification for such a methodology has been fully discussed by Whittington and Gibson (op. cit., 13), but since the nature of this study required concentration on one geographical area, it is accepted that certain other limitations must be accepted. The choice of plan for comparison with the Roy Map was therefore limited by geographical area. Obviously it would be preferable to use for comparison a map produced around 1750, and it may be argued of a similar scale. Nevertheless, the more detailed, large-scale plans which make up the 'Survey of Lochtayside', although completed some 20 years after the Military Survey, were regarded as the most appropriate (RHP 973 & 974)(Figure 7). This decision was made for a number reasons. Firstly, alternative maps available were simply not suitable. These included a map of the Breadalbane district, the exact publication date of which is unknown (c.1745), attributed to William Edgar, a surveyor who had also produced an unpublished map of Perthshire in 1745 (RHP 1903; RSGS 1936, 12). In monochrome, and clearly draughted, the content is highly selective, and only depicts the main settlements with tree symbols only appearing around the principal houses.

The National Library of Scotland also holds a map of Breadalbane, entitled 'An Exact Map of Breadalbane, engraved by G. Cameron. It was said to have been paid for by John Campbell, the Cashier of the Royal Bank of Scotland and adviser to the Earl, but its date of issue is not clear, although McArthur suggested this was between 1760 and 1774, and probably not much before 1769 (McArthur 1936, *xiv-xv*). This map depicts woodland evenly around the lochshore, extending up the Lawers and Morenish burns, up Glenlochay and in scattered patches over the hills between Glenlochay and Glenlyon. While it is a useful quarry for place names,

and interestingly shows the bounds of the Forest of Mamlorne, the depiction of woodland appears to be purely symbolic with no attempt to accurately locate woodlands on Lochtayside.

Secondly, although of a much larger scale than the Roy Map, and produced to facilitate markedly differing objectives, nevertheless, the accuracy and detail afforded by the Survey of Lochtayside, which was bound to produce an accurate representation of the landscape, particularly those features which were viewed as 'improveable', provides the best possible basis against which to evaluate the Roy Map.

Having accepted that the Survey of Lochtayside is the most appropriate source for comparison with the Roy Map, it is nevertheless important to be aware that apparent errors in the depiction of woodland in the Roy Map may have originated in landscape change over the intervening 20 years, and do not necessarily mean that this is because of surveyor or draughtsman error. On the other hand, it may be suggested that even after 20 years, the basic features of the pre-Improvement landscape of Lochtayside would not have changed very much. After all, the 1769 Survey was instigated as part of an attempt at the re-organisation and improvement of the estate, and anything undertaken before then might be described as 'tinkering at the edges' (ibid., *xiv-xviii*).

Although first impressions of the Protracted Copy of Lochtayside suggests a crude draft, since it is quite difficult to make out features, lines are roughly drawn, and the draughtsman's illustration of the mountains are roughly sketched, closer scrutiny reveals remarkably precise detail, particularly in the depiction of settlement location, place names, and the patterning of cultivated and wooded land. Indeed, it is a very fine piece of work, as befits the draughtsman, Paul Sandby, who later became highly regarded as a water colour painter. The Fair Copy, on the other hand, provides a highly visual depiction of the district, aided by the use of colour wash, and the artistry employed in the hill shading.

On the face of it, differences between the two maps are hardly discernible. Key locational features such as the drainage pattern, loch morphology and mountain topography are almost identical. On closer examination, however, variations between the two become apparent. Place names probably provide the most noticeable difference. Many places are omitted, or spelled differently on the Fair Copy. Thus 'Brae Earnan' clearly written across the face of the hillside, east of Ben Lawers on the Protracted Copy, does not appear on the Fair Copy. Interestingly, 'Brae Earnan' translates as upland of the alders, and coincides with

the area of woodland depicted on the south east slopes of Ben Lawers on Pont. The Protracted Copy also makes an attempt at recording the complexities of land division by naming some of the split townships. Thus 'Callelochanbeg' and 'Callelochanmhor' are recorded on the Protracted Copy, but only Callelochanbeg appears on the Fair Copy. These are the types of discrepancy which have also been highlighted by Whittington and others, and their conclusions can also be supported with regard to the variations of layout and content of the fermtouns and in the depiction of cultivation found between the two version of the Roy Map covering Loch Tay (Whittington 1986; Whittington & Gibson 1986).

In many ways, similar problems found with the interpretation of cultivated land equally apply to the interpretation of woodland on the Roy Map. Determining how accurate the rendering of these features are is made more difficult, especially in the Highlands, because this was essentially an unenclosed landscape with few definite boundaries. It has been suggested that the depiction of cultivation was purely symbolic (Whittington 1986, 25-26). This probably also applies to woodlands, although it would be expected that the military surveyors would, as suggested earlier, be more inclined to map accurately woodland because of its cover potential in military terms. The problem of areal distortion must also be considered, and may have some bearing on the level of accuracy of the depiction of woodland (O'Dell 1953; Whittington & Gibson 1986, 11).

Given the reliance on the Fair Copy by woodland historians, and particularly the dependence on it for identifying 'ancient' woodland sites by Scottish Natural Heritage, the question of the accuracy with which the woodland information was translated from the Protracted to the Fair Copy, must first be explored. At a glance, the correspondence between the two maps in terms of woodlands is quite good, and indeed, like Pont, the location of woodland is quite close to the reality, with concentrations at the west end of the Loch, and between the Ardtalnaig and Acharn burns on the south side.

On closer examination, however, there are small, but significant discrepancies between the two versions. In some instances the areas of woodland shown on the Protracted Copy do not appear on the Fair Copy. For example, east of Blaremore, on the north side of the Loch, three groups of trees are shown on the Protracted Copy, which do not appear on the Fair Copy. In this case it appears that a place name has been given precedence over the woodland on the Fair Copy; a feature which is repeated elsewhere on the map. In other locations, areas of cultivated land have been drawn on the Fair Copy where they do not appear on the Protracted Copy. There are also examples, however, of tree symbols being placed on the

Fair Copy in locations which do not correspond with what appears on the Protracted Copy. Nevertheless on balance, there are more omissions than additions of woodland on the Fair Copy. There is also clear variation in woodland morphology and positioning between the two versions, which although not significant in terms of determining overall extent and distribution, nonetheless would pose problems for the accurate locating of specific sites.

One of the most surprising omissions from the Fair Copy, is a substantial enclosure to the east of Ardeonaig, which is clearly shown on the Protracted Copy. It is characterised by being the only large-scale enclosure found on the Roy Map of Lochtayside beyond the main residences, and differs from the large enclosed feature at Lawers, which is clearly indicated by tree symbols rather than a solid line. Within this unnamed enclosure, both cultivation and tree symbols are depicted, and there is woodland extending beyond its southern boundary, yet all that appears on the Fair Copy is a mixture of woodland and cultivation symbols, which are not even entirely in agreement with the way in which they are depicted on the Protracted Copy. This oversight is all the more surprising because the representation of enclosure has generally been regarded as being remarkably good, with close correspondence between their portrayals on both Copies. Perhaps less surprising, is the imprecise transference of circular and rectangular features outlined by trees (obviously enclosures) from one version to the other. These surround a substantial building on the east side of the Ardeonaig burn on the Fair Copy.

Given all of the above evidence, it is probably accurate to say that this analysis of the Roy Maps of Lochtayside, would tend to reinforce the conclusions of others regarding place names and settlement. In addition, the depiction of woodlands on the Fair Copy must also be regarded as flawed (Moore 1991, 34-36; Whittington & Gibson 1986; Whittington 1986). Although there is possibly less variation between the two maps for woodlands than for cultivation, the relative importance of woodland to a military survey may help to explain this. Nevertheless there remain clear discrepancies between the two, which would suggest that any researcher utilising the Roy Map, who requires to establish the existence of woodland on more than just a general level, should at least consult both versions.

If it is accepted that the Roy Map provides an acceptable general level of information regarding woodland extent and distribution, then woodland historians may be justified in using it, with the qualification that the Protraction Copy is also consulted; however, given that significant variation has been shown to exist

between the two versions, the further comparison between both the Roy Map and more accurate, contemporary and later maps, was regarded as being essential.

By far the most noticeable deviation from the reality of the landscape is the rendering of the drainage pattern, which was remarkably similar between the Protracted and Fair Copies. While the main burns present on Lochtayside were depicted on the Roy Map, and it would be unrealistic to expect a survey of this scale to pick up the many subsidiary burns (not even the 1st edition OS maps were able to achieve this), the courses of these main burns are depicted with scant regard for accuracy. The most conspicuous misrepresentation of the reality is of a rather substantial burn to the west of Cragganester, known from other maps as Allt a Choire Chireinich. It appears on the Roy Map entering Loch Tay immediately below Cragganester, and slightly west of a tree covered hillock. In fact the mouth of this burn lies east of this hillock at the milltown of Balnahanaid. Almost all the burns on Lochtayside deviate in some form from reality, as does the morphology of the shoreline.

While, on the face of it, the misrepresentation of the course of burns cannot be regarded as significantly altering the area of woodland present on the Roy Map, any attempt at site-specific delineation and accurate locating of woodland must be problematical particularly if, as is often the case, permanent features such as burns and shorelines are relied on to locate woodlands on modern maps. Such a task though feasible, would be exacting, requiring detailed analysis of all available cartographic sources. At best, the resulting delineation of woodland sites on the Roy Map would be a rough approximation.

The 1769 Survey of Lochtayside which took two surveyors, John Farquharson and John McArthur, 10 months each to complete, at considerable cost, has rightly been regarded as unique. According to McArthur, who published the Survey in a Scottish History Society series, it was no surprise that the 3rd Earl of Breadalbane, the proprietor of an extensive estate, "should have elaborate surveys executed, which in their wealth of detail and careful workmanship surpass any others which have come to light" (McArthur 1936, *ix*). It was therefore entirely suitable to use the two volumes of large-scale Plans (12 inches to 1 mile) and accompanying two volumes of Surveyor Reports, for comparison with the Roy Map (Figure 7). It was also, with all its detailed acreages, notes and assessments regarding the disposition and composition of each farm on Lochtayside, including woodland, as an exceptionally important, complementary source for the study of the woodland history of Lochtayside. That is not to deny that there are some intrinsic problems

and anomalies in relation to the depiction and definition of woodland on the 1769 Survey, and these will be more fully discussed later in the section.

It has already been stated that the depiction of woodland on the Roy Map is regarded as being sufficient to present a good general impression of where the concentrations of woodland were around 1750, and it is further considered that the Protracted Copy probably provided the closest approximation to the reality. How then does that approximation compare with the detail provided 20 years later by the 1769 Survey? As expected, nowhere on the Protracted Copy is there woodland which is not also present on the 1769 Survey. Where these two sources correspond, there is a degree of consistency in the extent of woodland. Thus, there is agreement in the location of an extensive woodland, referred to as Chromiltan Woods on the 1769 Survey, spreading beyond New Park of Tay westward, as far as Easter Tullichan. There is also general concurrence in the concentration of woodland at the south west corner of Loch Tay, although no indication of the state of enclosure, so apparent in the 1769 Survey, is evident on the Roy Map. This may, of course, be accounted for by the creation of these Parks after 1750, a fact which may be substantiated by reference to the estate records.

There are, nevertheless, significant omissions of woodland from the Roy Map which appear on the McArthur's 1769 Survey, including for example, on the south side of the loch between Ardeonaig and Allt a Mheinn (Aldvain on Roy). In this area, covering about a mile of lochshore, there were approximately 35 acres regarded as woodland on the 1769 Survey, some of which included an enclosed ashwood. These were not shown on the Protracted Copy, although some small groups of tree symbols have been added to the Fair Copy. In addition, the area between Ardtalnaig and Lickbuy was also depicted as being devoid of trees on the Roy Map, whereas according to the 1769 Survey, there were over 65 acres of woodland, mostly on the east side of the Ardtalnaig burn (See Figure 10).

Such discrepancies are less marked on the north side of the loch, although the detail of individual woodland, both natural and planted, is naturally more apparent on Farquharson's 1769 Survey. The Protracted Copy, however, shows up one of the problems of definition, and to an extent surveyor bias, which remains one of the most difficult to resolve for the woodland historian, cartographer and botanical surveyor.

On the Protracted Copy there is clearly, albeit less marked on the Fair Copy, a smattering of woodland from just west of Ballimenoch eastwards to Boreland, on

the north side of the loch. Farquharson, however, obviously did not include in his calculations of woodland on these farms for he commented "there is besides a great deal of hazel, alloers (alder) etc., but as these seem not to be regarded as wood I have included them in grass" (McArthur 1936, 57). Although this remark referred specifically to a farm just to the east of Boreland, Farquharson's perception of what should be regarded as woodland is apparent throughout his survey, and especially prevalent along this section east of Lawers, for compartments on farms described as being "full of bushes" or "full of alloers" are classified as meadow or grass and never, unless composed of oak, ash or fir, classified as wood.

It is often the case, however, that the Plans employ tree symbols to indicate woodland which in the Reference Books are described as 'grass' 'pasture' or 'meadow'. In addition, it appears that McArthur had a tendency to double count woodlands. For example, on Margmore, east of Ardeonaig, McArthur includes an area of woodland of approximately 14 acres, in both the 'wood' and the 'meadow' columns of his Report. It may be suggested that two conclusions can be drawn from these apparent anomalies. Firstly, it seems likely that these two surveyors who were working at the same time on either side of the loch, were not issued with identical, or strict instructions, and may have been allowed a fairly free hand to survey the farms using their own methods and definitions. There are a number of other variations in content and style between the two surveyors' work.

Secondly, and perhaps more importantly, each surveyor, for whatever reason, perceived woodlands in a different way. McArthur viewed many of the woods as existing to be "cutt for the service of the country" (ibid., 82), and regularly counted them as 'pasture' or 'meadow'. Farquharson never did this, but seems simply to have ignored all woodland except those composed of oak, fir, and sometimes birch and ash. He also noted, perhaps with an eye for commercial potential, some areas assessed as 'meadow' or 'grass', which "seem to have been sometime in wood and if enclosed would yett spring up"(ibid., 25), but he did not, unlike McArthur, mention the woods being for local use. With those woodlands classified as wood, he tended to make notes about the care given to them and their age. Perhaps there is a subtle indication in these apparent anomalies, and inconsistencies in the way the surveyors assessed woodland, which would have seemed obvious to the Earl or any of his overseers, but which are almost lost to the 20th-century woodland historian.

It may be tentatively suggested, therefore, that some areas of woodland were regarded as having commercial potential; most probably those indicated by

Farquharson as 'wood', on the north side, and on the south side, those which were only assessed as 'wood' and not as 'meadow' or 'pasture'. Those areas of woodland which were accepted by McArthur as being for local use, whether to be paid for or as a customary 'right', were noted as such, while others regarded as providing shelter or hay were assessed as 'meadow' or 'pasture'. Some may have fulfilled both functions. This type of woodland, on the north side, appears simply to have largely been ignored, and the only indication that it existed is to be found either in the depiction of woodland in the Plans, or in the references in the Surveyor Reports of 'meadow' and 'grass' being 'full of bushes' or having potential to become woodland.

The inconsistencies which have become apparent through studying in detail the woodland depicted on the 1769 Survey, and the accompanying Surveyor Reports, are a reminder that the Survey of Lochtayside was in fact two separate surveys, and part of a wider strategy for reorganisation of the Breadalbane estates, which included the survey of other portions of the estates in 1769, including around Aberfeldy (Bil 1990, 370; McArthur 1936, *xi-xiii*). Nevertheless, the value of the 1769 Survey is unsurpassed among the other cartographic sources, and indeed, as a complementary source to the Breadalbane Muniments.

Essentially, the Survey of Lochtayside portrays the landscape and form of economic organisation of the pre-Improvement Highlands. It illuminates a patchwork of predominantly open, irregularly-shaped and variously-sized patches of arable land, intermixed with meadow, pasture and woods, all clearly demarcated, usually by a head dyke, from the moorland on the hillsides above. The only signs of improvement, in the form of enclosure, were to be found in the environs of the current and former family seats at Taymouth and Finlarig respectively, or where other principal families had dwelt, as at Achmore, Lawers and Ardeonaig. This landscape was about to undergo a significant transformation, and indeed it has been suggested that it was no accident that the 3rd Earl of Breadalbane commissioned a survey at this time, just a year prior to the parliamentary Act of Entail which held the prospect of being of great importance for facilitating agricultural improvements in Scotland, which were in turn largely responsible for this metamorphosis of the landscape (ibid., *xviii-xx*).

As a result, Farquharson and McArthur were not simply employed to produce elaborate maps and plans of the Breadalbane estates in response to the whim of a great Highland magnate; rather the survey had a specific purpose and the surveyors were obviously expected to assess the condition of the district and advise on the potential for its future reorganisation and improvement. By

establishing the current state of cropping and stocking, the potential of the soils and identifying where opportunities for improvement were to be found, the Earl would be better placed to initiate reorganisation of the farms, which would then be more conducive to granting leases at increased rents and making investments in physical improvements such as dykes and farm buildings. The scene was therefore set for major changes to take place in Lochtayside's economic and social landscape.

This focus on the agricultural potential of the district may, however, go some way towards explaining why woodlands were dealt with by the surveyors in a less systematic way than was achieved for the agricultural elements of the landscape. If enclosure of fields and farms on Lochtayside in 1769 was largely confined to the principal houses of the district, then indications of woodland management were even less evident. Economic exploitation of the woodlands was also obviously regarded as the prerogative of the landowner, and periodic assessments of that resource were separately carried out (e.g. GD 112/-15/462, 16/11/2). Nevertheless, the differentiation of woodland regarded as having commercial value, from those earmarked for local use, both for grazing and local timber requirements, may be expected to be revealed in the 1769 Survey by the depiction of woodland enclosure. The premiss being that if a woodland was shown to be enclosed on the 1769 Survey, then the cost of such an operation must have been felt to be justified by the expectation of an economic return, although this is not to dismiss the possibility that the local community also employed conservation methods.

Given Lindsay's assertions about the value of woodland produce not increasing progressively until the last decades of the 18th century, it is not surprising that few woodlands on Lochtayside appear to have been enclosed in 1769 (Lindsay 1974, 403-4). On the north side, solid lines marked around sections of woodland would suggest some form of wood enclosure. This is particularly evident for the Officiaries of Crannich, Carwhin and Kiltyrie, where Farquharson also made reference to some of the woods being young and well kept, while others "if enclosed would yet spring up" (McArthur, 1936 24-35). As already mentioned, elsewhere on the north side woods were barely recognised, let alone enclosed and perceived as having commercial potential.

On the south side, McArthur appeared to be more willing to recognise woods as such, yet surprisingly, given the greater extent of woodland on this side, they appear to have been largely unenclosed, and viewed as non-commercial, providing an exploitable resource for the local pastoral economy. It is also less clear

whether the solid lines drawn around some elements of the farming landscape, including woodlands, are indicative of a physical boundary, or just simply lines of demarcation. Even where a relatively straight boundary line is shown, which might indicate a fence or dyke, such lines rarely enclose completely or only discrete units of woodland; rather they appear to be either associated with crop land or pasture. From this it might be concluded that while some woods were enclosed and managed for their commercial bark or timber values on north Lochtayside, woods were rarely enclosed for reasons of woodland conservation and management on the south side; rather they were simply being exploited for what Lindsay has defined as non-commercial value; that is, their grazing, fodder, shelter and domestic timber values, without consideration to sustainability (Lindsay 1974, chpts. 3 & 4). This is certainly the case for most of the larger woods on the south side, and indeed McArthur often affirms that the woods were "cutt for the service of the country" (McArthur 1936, *lxiv*, 125). In fact although he seems to have viewed woods primarily as a key element of the pastoral system, he was also critical of treatment of the woods by the tenantry. Thus he "observed that the common course of the country is to take the best and leave the worst as they have a throwgh-bearing that same way" (ibid., 83).

The pattern of enclosure on the farm of Achmore at the south west corner of the loch, and across the Loch around Finlarig, appears vastly different from elsewhere on the lochside. The Plan of Achmore depicts extensive areas of predominantly oakwood within enclosures referred to as 'Parks'. It is possible therefore that the treatment of these extensive areas of natural woodland was different to most other woods on Lochtayside. However, without an understanding of the origin and function of these parks, including Oakwood Park, Qualdochart Park and Firbush Park, it would be difficult to reach any conclusions about the role of these woodlands in this system of enclosure.

Gilbert, in his work on medieval hunting reserves, defines a park as "an enclosed game reserve surrounded by a ditch and bank on the top of which was a palisade", but he added that it "might also signify an enclosed area where stock other than game was kept" (Gilbert 1979, 215). However, those parks which he described were mainly in the Lowlands, and no references appeared for Lochtayside. Anderson also looked in detail at the formation of parks since the middle ages, and cited various examples of their purpose and location. He drew, for example, on the Black Book of Taymouth, where there are entries regarding the creation of parks on the Breadalbane estates. Thus an entry for 1613-14 proclaimed "Item, Sir Duncane Campbell of Glenurquhay knicht causit mak parkis in Balloch, Finlarge, Glenloquhay and Glenurquhay" which he planted with trees (Anderson

1967 V1, 337). The dykes built around these parks were apparently originally made of 'feal' or turf only, as were the park dykes at Crannich.

The parks which appear around Finlarig on the 1769 Survey may therefore have their origins in those early parks described above, and it is conceivable that those depicted across the loch around Achmore had similar origins, despite the lack of reference to them in the Black Book of Taymouth. Neither Pont nor Roy indicated enclosures in this area, although as has already been stated, the accuracy of both these cartographic sources at this scale must be questioned. It is clear, therefore, that cartographic sources are not able to furnish the level of detail required to answer the question of origin of these parks. Further investigation of documentary sources would be required to substantiate any tentative conclusions that might be drawn from the map evidence.

The question of the function of these parks is equally ill-defined in the 1769 Survey. In making his agricultural audit of the farms of Lochtayside, the only information McArthur provided for the farm of Achmore, was that which appeared on the plan itself. Fortunately, Farquharson did provide clues to the origin and function of these large parks in his report on Finlarig. The farm he said was "both adapted to grain and pasture, but especially the latter", while he described one of the parks as having "good stone inclosures, the walls of which are 6½ feet high being originally a deer park" (McArthur 1936, 3). Furthermore, of the 455 acres (scotch) which comprised the farm of Finlarig, 67% was classified as 'grass and wood', and almost all was enclosed in parks containing a significant amount of woodland. The remainder of land on the farm including the infields were also largely given over to grass (ibid., 4-6).

Dodgshon has described the laying out of grass parks around the policies of many Lowland estates in the late 18th century, and related this to the growth of the cattle trade. It may be that, in common with the Laird of Urie's estate in Kincardineshire, there was also "considerable charge and expenses in building of dikes and inclosures for the preservation of grass and trees" laid out on the Earl of Breadalbane's Perthshire estate (Dodgshon 1981, 262, and quoting from Barron (ed) Court Book of Urie, 111). Although this may suggest a form of wood pasture, in the English sense, some of the parks on Finlarig could by no means be described as open woodland suitable for producing good pasture (Rackham 1980, 5-6). One potential indicator of wood pasture would be the presence of pollarded trees. In fact, there is currently one very old oak tree, and several slightly younger ones, present within the bounds of the former Qualdochart Park which have form both exhibiting characteristics of a pollarded and a coppiced tree. The presence

of these few trees, which in reality were more likely to have been boundary trees, however, is probably not sufficient evidence of the existence of wood pasture. It is an area of research worth pursuing, particularly in the field. In addition, Farquharson refers to a number of the parks being "full of natural firs [with] bad grass" and suggested that "the plantings [should be] judiciously thinned" (McArthur 1936, 4, 6). Furthermore, although there was no report for the parks on Achmore, the variation in density of tree symbols employed by McArthur suggests that, while the ridge and hillside within Firbush Park supported open woodland, the lower slopes and loch shore of this and the other parks, were largely composed of much denser woodland. Moreover, such woodland is unlikely to have supported the kind of grass sward which would have provided good grazing.

The suggestion that the existence of these parks at the west end of Loch Tay in 1769 was the result of an attempt at emulating modern Lowland practices of animal husbandry by a landowner 'bitten' with the 'improver' spirit, might further be substantiated by the fact that Achmore was the residence and farm of the Earl's factor, John Campbell of Achallader. It would be quite reasonable to expect that Achallader should adopt the most up to date farming practices, both as a means to increase the commercial value of his farm, and also to set an example to the tenantry. If Achmore was perceived as being a model of modern agricultural practices, this may explain why no report or assessment of Achmore appeared in the 1769 Survey.

Regarding the origin of the parks on Achmore: although the current study has not uncovered documentary or cartographic evidence for their origin as 17th-century or earlier deer parks, unlike Finlarig which apparently originated in the early-modern period, it cannot be discounted that the foundation of some or all of them was contemporaneous with the Finlarig parks, or even earlier. Of course this could only be substantiated by means of archaeological excavation and research of early documentary material. The location of an "ancient fortification" (RHP 973/1-2) at Firbush Point, and a fort on the ridge above, within the bounds of Firbush Park (OS. 1:25000, NN 63/73) certainly suggests that this area was viewed as being important by earlier inhabitants.

Moreover, the smaller parks of Achmore, referred to as Oakwood Park and Qualdochart Park in the 1769 Survey, were more likely to have been contemporary with the Finlarig parks, or earlier in origin, since the presence of arable land within them might indicate later incursion into the woodland, following the original laying out of the enclosure. It may also be suggested that the laying out of regular shaped divisions and two large 'New Parks' on the hillside

above Achmore is more likely to have been a more recent act of enclosure perhaps, as Dodgshon has suggested, in response to the development of a more lucrative cattle trade (Dodgshon 1981 306-308).

While it does seem likely that in 1769 the purpose of these parks was predominantly for livestock pasturing, and neither surveyor mentioned their current use as game reserves, that is not to disregard completely the possibility that they were also regarded as important for game. Once more, only recourse to other documentary sources may clarify their function in this respect.

It may be suggested that, whatever their origin, their function at that time should be viewed as a response to market opportunities afforded by the burgeoning 18th-century cattle trade, which saw the price of cattle rise by 300% between 1740 and 1790, and the developing improver zeal of landowners (Smout 1969, 323). The importance of the cattle trade to the Breadalbane estates, and the relationship it had with increased rents has been highlighted by Dodgshon (op.cit., 308). Market opportunities were again probably responsible for according the woodlands within these parks greater significance later in the century, when the value of bark and timber significantly increased, causing a shift in management practices within these parks. Later, towards the mid 19th century, falling prices for the produce of these natural woods again resulted in changing management. Those parks large enough were converted, perhaps once more, to game reserves, while those that were smaller, and least suited to game management, were opened up to sheep, or increasingly planted with conifers. A fuller discussion of the development of the natural woodlands of Lochtayside will follow in the next chapter.

None of the above conclusions has been derived solely from reference to the 1769 Survey. Neither is it possible to determine from it what forms of enclosure were being employed on the estate, although some clues may be detected from the plans. New Park of Tay, for example, which was one of the few enclosures depicted on the Protracted Copy of the Roy Map, evidently had a substantial structure built around it. A bridge-like feature at its south-east corner might be interpreted as indicating the presence of a ditch, in addition to a dyke. Similar features depicted crossing boundaries surrounding Oakwood Park and Qualdochart Park, might also be taken as illustrating ditches.

It is also worth noting that there was one reference to 'earthen' dykes found surrounding some of the outfields of Tomb, by Lawers, which suggests that Farquharson regarded them as outdated (McArthur 1936, 39). It is not clear, however, if they were depicted on the plan. An up-to-date orienteering map at a

scale of 1:15000 covering an area of approximately 2 km radius of Firbush Point, depicts a series of earth walls to the east of Allt Breaclaich which bear a close resemblance to the shapes of some of the outfields marked on the 1769 plan. It also indicated the remains of a stone dyke forming an enclosure within the bounds of Firbush Park, which can be clearly identified on the 1769 Survey as Calfward. It is clear that further field survey and cartographical representation of this high standard, would be invaluable to the historical geographer.

It is known from published sources and the Breadalbane estate papers, that fences of 'stake and rice' or 'pailing' (small branches woven into vertical supports, like wattling) were common forms of enclosure for woods and fields. Unfortunately the 1769 Survey is of little use for determining the presence of such forms of enclosure (Marshall 1794; Wight 1778-84). It may be that because of their short lifespan they were not regarded as important enough features of the agricultural landscape to be depicted. In addition, if there was an attempt at division of woodland into haggs (a portion of a wood designated for felling) using temporary wattle fences, it is probable that they would not be shown on the plans. Moreover, since the more durable stone dykes were regarded as the type of enclosure which should be aspired to by the tenantry, and their depiction on the plans would assist with the development of a strategy for farm reorganisation, including where new enclosures were most required, it is possible that stone dykes were the only form of enclosure depicted on the plans. It must be recognised, therefore, that the Survey of Lochtayside can only provide a partial picture of the detail of form, function and origin of enclosure, and in this respect, recourse to the Breadalbane estate records must be regarded as essential, alongside archaeological field survey.

It was to be almost a century after the completion of the 1769 Survey before another map of Lochtayside appeared which could furnish the detail and level of accuracy necessary to advance the understanding of the condition and extent of its woodland resource. This was the first edition of the Ordnance Survey, sometimes referred to as the County Series, truly the first large-scale national survey of Great Britain, completed at a scale of 25" and 6" to the mile for Lochtayside around 1862, and published in 1867. In the intervening years there had been an almost complete transformation of the social and economic landscape of the Highlands, and the economic value placed upon natural woodlands had been subjected to a process of economic ebb and flow, being then in recession.

The First edition of the Ordnance Survey, hereafter referred to as the OS, accurately depicted a landscape being transformed almost beyond recognition from that which existed only 100 years earlier. The co-operative based pastoral

agriculture of Lochtayside, based largely on cattle, was being replaced, as elsewhere in the Highlands, by a rural economy with a much greater emphasis on sheep production, and supporting a much reduced population (see Figure 3). Those who had become excess to the requirements of the agricultural economy had either left the district, or were being absorbed by the developing rural service and small-scale industrial centres such as Killin, Kenmore and Aberfeldy (Stewart, 1984).

Walker and Kirby, in their discussion of the OS as a source for the Nature Conservancy Council's (NCC) Ancient Woodland Inventory for Scotland, while recognising that Roy's surveyors may have missed some woods, and that there had been an increase in plantations since the mid 18th century, suggested that the apparent increase in the woodland area shown on the First edition OS maps over that depicted on the Roy Map, could nevertheless be partly attributed to a genuine expansion of woodland area, resulting from changes in such factors as the level of grazing pressure (Walker & Kirby 1989, 18). Notwithstanding the earlier discussion about the Roy Map which would tend to undermine seriously any conclusions based on the extent of woodland depicted on the Fair Copy, it is worth examining this issue, given that the more appropriate comparison of the OS with the 1769 Survey does indicate overall a modest increase of woodland.

On the face of it the extent and location of woodlands on Lochtayside had changed very little between 1769 and 1861, with the main concentrations of woodlands remaining constant. However, close examination of the differences in woodland extent depicted on the 1769 Survey and the OS for Lochtayside does not support this very generalised view of 18th and 19th century woodland history. Where there was the appearance of 'new' woodlands, these could generally be accounted for by the development of plantation forestry and amenity planting, such as the extension of coniferous planting to cover the whole of the south side of Drummond Hill, and the numerous small roundels of mixed species apparent in the mid-19th century landscape of Lochtayside.

Outside the plantations, a complex pattern of woodland had emerged as a result of the trends in woodland utilisation and management over the preceding century. Those woods which had been viewed as offering the greatest potential for commercial exploitation in 1769 and thereafter, were most probably those which in 1862 were enclosed. Furthermore, it is clear from comparison of the two sets of maps and plans, that the area of woodland enclosed had increased, both on the north and south sides of the loch (Figure 8). Perhaps as an indication of the value that had been placed on oak coppice, a woodland enclosure was depicted above

Cualdochart Park in 1862, which did not exist in 1769. It appeared as a dense broadleaved woodland , most likely composed of pure oak, where in 1769 it had formed a small part of New Park, where only a small oak-covered knoll had been depicted. In some cases, as on Kiltyrie (see Figure 8), the woodland area may have increased following enclosure beyond the woodland boundary depicted on the 1769 Survey. More often than not, however, and particularly on the south side of the Loch, only a core area of woodland was enclosed. This left marginal areas of woodland, presumably of lower-quality timber unenclosed; perhaps as a compromise to the grazing requirements of the tenantry's stock.

Another feature of the natural woods which had been enclosed by 1862, presumably for their bark or timber potential, was that they were often depicted as being composed of a mix of conifer and broadleaved trees. Although neither McArthur or Farquharson employed different tree symbols to differentiate between conifer and broadleaf, they generally indicated either within their reports or on the plans, what type of trees predominated. The OS maps were the first really to address the definition of woodland, and various categories for trees and shrubs were defined for use by the surveyors, which enabled the communication of a clearer picture of the composition and density of woodlands in Britain. The appearance in 1862 of mixed woodland, where in 1769 there had only been broadleaved woodland, may therefore be put forward as further evidence of the shift in emphasis from the natural woods to planting and plantations, both of broadleaves, but particularly of conifers, and most probably in response to both economic expedience, and the continuing fashion for ornamentation of the countryside. Some initial field survey of Firbush Point (GR NN60 33, Craig Dow (GR NN63 34) and Craig Wood (GR NN69 38), undertaken as part of this study, would support the above assertion. It revealed the presence of beech, Scots pine, larch and possibly planted oak trees, estimated to be at least 100 years old, scattered through woods which in 1769 were described as natural woods, but shown as mixed at the time of the first OS.

As for those woods which in 1862 were depicted as unenclosed, it seems likely that their utilisation for local timber needs, and especially for pasture and shelter, remained their principal functions. It was within this type of woodland that the most significant changes had taken place in their condition and extent since 1769, with examples of both expansion and recession being discernible, with the latter more common. Thus localised concentrations of broadleaved woodland and scrub were depicted in 1862, scattered over the hillside above Achmore, within the area referred to in 1769 as New Park. These scattered pockets of woodland did not appear to have existed in 1769.

The problems of definition encountered with the 1769 Survey have to be taken into account, however, for it was possible that areas of woodland which appeared on the OS were not recognised as such on the 1769 Survey. Consequently they might not be of planted origin or secondary stands, but may in fact be 'ancient' in origin. As already discussed, very little detail was provided for the farm of Achmore, and it is conceivable that the large area of hillside taken in by the creation of New Park did support scattered woodland. Further evidence to support the possibility that Farquharson and McArthur omitted from the plans some areas of woodland or scrub, was to be found in the report on Balnahanaid farm on the north side of the Loch. A wooded hillock which formed part of an extensive, enclosed broadleaved woodland and brushwood on the OS, was depicted as 'grass' on Farquharson's plan, but it was probably the area "what called Craig volnahanaid [which] seems to have and still inclines to wood" (McArthur 1936, 35).

A comparison of the 1769 plan covering the area from Tomnadason to the Ardtalnaig burn with the OS 25" map for that area revealed, with the exception of a small area of amenity planting on a knowe once occupied by farm buildings, a picture of contraction and fragmentation of the woodlands. McArthur had described them as being composed of ash, oak, birch and 'shrubwood' (given current composition, probably hazel), and had remained unenclosed since 1769. By the mid 19th century, probably following sustained exploitation for fuel, timber, grazing and shelter, they had the appearance of a fragmented and depleted woodland resource. Elsewhere, the pattern was similar and, in some instances, small sections of woodland had been completely cleared for agriculture (RHP 973/1-2, OS *LXIX* 3/7 25"). It may be worth recording a note of caution, however, for the impression of decline may be overestimated; the result of visually greater variation in the representation of woodland on the OS, which is created by its finer definition of woodland type.

Two companion sources of information compiled by the OS greatly enhanced the value of the First edition. These are the Parish Area Books, which record the area and land use of each numbered parcel of land identified on the 25" maps, and the Name Books, which provide information gathered by the surveyors relating to the place names employed on the maps. The latter are held at the OS headquarters in Southampton, with microfilm copies available at the Royal Commission for Ancient and Historic Monuments in Edinburgh. Regrettably, the books relating to the parishes and detached portions of parishes incorporating Lochtayside, were destroyed during the Second World War.

The Parish Area Books were published, and are available for reference at the National Library in Edinburgh. These allow accurate area calculations to be made of most discrete blocks of woodland and therefore the total woodland area for Lochtayside could be accurately calculated. This figure could not, however, include scattered woodland which had been parcelled with other land uses. The record of land use for each parcel, as opposed to vegetational status which is shown on the maps, can also provide useful information regarding what woods were being used for. It is interesting to note, for example, that some areas depicted as a mix of open woodland and scrub were recorded as pasture, while the land use of other woods was recorded as woodland. So while the maps record the vegetational character of the land, and delimit their boundaries, albeit often in an arbitrary and artificial manner, the Parish Area Books offer a glimpse of the management regime likely to have been imposed upon them. Furthermore, it may be suggested that if comparative analysis was made of the state of enclosure of woods on the maps with their stated land use, it might be expected that a close correlation would be found between those which were enclosed and those which were regarded as woodland. Whether or not the enclosed woodland area was under some form of silvicultural management (for example coppice), or was falling into neglect as demand for their produce fell, thereafter being simply exploited when required, cannot be established from the work of the OS alone.

In conclusion, the landscape depicted by the OS does suggest an increase in the importance of plantation forestry, and decline in the natural woodlands probably as a consequence of the growth of sheep farming, which was competing increasingly successfully for low-lying wooded land. While it would be dangerous to generalise about the trends in woodland extent and condition for the whole country, the evidence from Lochtayside and other parts of the Highlands, suggests that Walker and Kirby's assertion that there had been a genuine increase in woodland cover, over and above the increase in plantations, resulting from changes in the level of grazing pressures, must be questioned. If they meant by this that grazing pressures had been reduced since the mid 18th century, then the evidence from Lochtayside and elsewhere does not support this view. The trend on Lochtayside was of contraction and fragmentation of the natural woods, probably brought about by the sustained exploitation of them for non-commercial uses. It may be tentatively suggested that woodlands in other parts of the Highlands which were not of sufficient commercial value to come under, or be retained in, a sustainable woodland management regime, were also at this time being subjected to increasing pressures from non-commercial uses of their area and produce. (Lindsay 1975a, 88, 92).

Conclusion

The Survey of Lochtayside provides a uniquely detailed picture of agriculture and settlement over a substantial part of the Breadalbane estates at a time when the Highlands were on the brink of far-reaching changes in their the social and economic structure. As such, it must be regarded as the most important cartographic source for this study. There can be no doubt that it is far superior to the Roy Map as a source for historical geographers studying the landscape of mid 18th century highland Perthshire. Indeed, it would not be going too far to say that this study has demonstrated that serious doubts must be cast over the validity of any work which utilises the Roy Map, in particular the Fair Copy, to determine woodland extent and location at more than a general level. In particular, it must be acknowledged that the Ancient Woodland Inventory for Scotland may have seriously underestimated the extent of 'ancient' woodland, although further quantitative analysis of this is required. Despite these very critical limitations, along with the Pont Map, its use for comparison with the 1769 Survey signalled the possibility that the latter did not depict all woodlands present on Lochtayside. The combined use of the Protracted and Fair Copies must therefore be regarded as a useful comparative tool.

The Pont Maps must be regarded as an important source for woodland historians, if for no other reason that it is the only late 16th century cartographic source for Lochtayside. Furthermore, analysis of the depiction of woodland on the Pont Map covering Lochtayside throws up some interesting questions about the execution of the mapmaking process by Pont and others, which would merit further research in relation to woodland. In some respects both the Roy and the Pont maps which are less shackled by cartographic conventionalism or market-based objectives, are less subjective in their depiction of woodland.

As far as the First edition of the OS is concerned, there is no doubting its cartographical excellence. In many ways, however, the Survey of Lochtayside reveals more about woodland, particularly their tree composition, than the First and later editions of the Ordnance Survey, because although they have the advantage of being at a larger scale (1:2500), and were the first maps to really address the definition of woodland, for the most part, they could not depict the species or age composition of woodlands. The Survey of Lochtayside is therefore able to play a crucial role in the determination of compositional change which may have occurred throughout this particularly formative time in the evolution of Scotland's woodlands. The Survey therefore provides a unique record of Scottish

woodland prior to a period of intensive commercial utilisation, followed by the decline of the later half of the 19th century, and up to the present.

It is clear from all the cartographic sources discussed in this chapter, that much depends on the objectives fuelling the production of maps and plans, and the accuracy and consistency of their execution. As a result, their content can vary considerably, leading to difficulties for the researcher who undertakes this type of comparative analysis. Nevertheless, cartographic sources can greatly assist the identification of temporal and spatial changes of the landscape, and offers the historical geographer a means of clarifying and supplementing other evidence. Any study of local woodland history would therefore be incomplete without consideration of this form of historical source.

Summary

In order to construct a picture of the utilisation and management of Lochtayside's woodlands, and the wider rural society and economy, of which it was an integral part, a critical examination of a number of sources was undertaken. Estate papers, in this case the Breadalbane Muniments, formed the most important source for this study, but it was also regarded as essential to seek information from other sources, both published and unpublished, written and cartographic. This was achieved by evaluating these sources, in terms of their disadvantages and advantages, and then applying this to an investigation of the history of Lochtayside's woodlands.

Published sources can provide a wealth of information, some of which can be very important in the understanding of any study of the historical geography of an area. All of those published sources, however, must be read with care, and an understanding of the reasons for the origins of these works, who they were written by, and who they were written for.

There exists within the Breadalbane Muniments some tantalising morsels of information regarding the woodland history of the estate, including information regarding the local production of charcoal, the sale of bark and timber outwith the locality, and the proposal for production of pyroligineous acid on the shores of Loch Tay. Such sources are fragmentary, and sometimes difficult to understand, particularly as the papers were not written with the woodland historian in mind. Nevertheless, they provide a unique level of information about many aspects of society during the study period.

This was followed by an evaluation of the cartographic sources available for Lochtayside, which were critically evaluated for their appropriateness in depicting the extent, distribution, and composition of the woodlands of this district. In particular an assessment was undertaken by comparative analysis of the Military Survey of Scotland (1747-55), using contemporary estate plans, and with reference to other cartographic sources. In addition, spatial and temporal changes in the woodlands of Lochtayside were investigated using the 1769 Survey of Lochtayside, the First edition Ordnance Survey from the mid 19th century, and the current OS maps of Lochtayside. It is clear, that while historical cartographic evidence can greatly enhance the understanding of the past nature of the Scottish landscape, its application to historical research cannot be accepted uncritically. Indeed, this chapter has demonstrated that this must apply to all sources for historical geography. Once this is achieved, a more informed evaluation can be applied to the area of study, which leads to a greater understanding of the subject matter.

CHAPTER THREE

The Utilisation and Management of the Semi-Natural Woodlands of Lochtayside

It has been established in the previous chapter that there were extensive areas of semi-natural woodland on Lochtayside, which up until the mid-19th century remained extensive, and indeed, even today, though much altered, considerable amounts of semi-natural woodland remains. While the relative proportions of woodland during the period have not been quantified, it may be suggested that these were of an area and composition likely to have been of sufficient value to make them commercially viable.

By the mid-19th century, however, the cartographic, and other evidence appears to indicate that the semi-natural woodland area of Lochtayside was becoming increasingly fragmented. Evidence exists to support a decline in the 'natural' woodland area between 1769 and 1861, accompanied by a general increase in the overall woodland cover through an increase in plantations.

The available evidence for the exact extent of woodland, in the 17th century and earlier, is sketchy, but it is perhaps worth noting the anecdotal evidence of the 2nd Earl of Breadalbane, which is provided in a letter written in 1723 to his newly-appointed overseer of woods in Breadalbane. In it, he refers to the stalwart work of his ancestor, Sir Duncan Campbell, 1st Baronet of Glenorchy (1583-1631) who "tho the country was full of wood had every know[e] fenced as you may see the foundations yet" (GD 112/16/10). If this impression of the extent of woodland cover in the time of Sir Duncan is accepted, and given that Pont's map of Lochtayside around this time goes some way to corroborating this impression, there is no reason to doubt that there was an ongoing process of decline in the 'natural' woodland resource in the historic period, which was not checked by the development of coppice management on Lochtayside, although it may have been slowed down.

It is the intention of this chapter to examine the forces of change affecting these woodlands, and to attempt to determine the factors involved in the use of the semi-natural woodlands of Lochtayside which resulted in the alteration of the character of the woods. In particular, an assessment will be made of the relative importance of commercial and non-commercial uses of the woodlands throughout the period, and relating this to the chronological breakdown defined in Chapter One. Furthermore, a brief exploration of the nature of this utilisation will be

made, in terms of whether this was purely exploitative, or whether attempts were made at some form of sustainable management.

The Non-Commercial Utilisation of the Woodlands of Lochtayside

Ownership and Control of the Woods

The ownership and control of woodlands in the Highlands was, and still is, inextricably linked to feudalism; a complex economic and social structure based on the control and ownership of land. Consequently, in the Highlands, and indeed elsewhere in Scotland, all woodland on an estate, including any planted by tenants, was the property of the landowner, so the use of this woodland by the tenantry and their dependants was a privilege rather than a right. Interestingly, this lack of rights was not found in some other feudal societies, for example in France.

While the tenantry had no legal right to the use of woodland, the utilisation of its produce for a great variety of domestic purposes, and its area for grazing and shelter of their livestock, was indispensable to them, particularly in the Highlands. Their customary use was therefore sanctioned by the landowners, but how far this privilege extended is not clear. In the late 18th century, Marshall stated that the barons of north Perthshire had permitted uncontrolled use of woodland by the large tenantries kept as fighting forces; he also claimed that the woods of the remote parts of the country had been free for unrestricted use within living memory (Marshall 1794, 24, 27). There is probably an element of truth in this accusation, given the former prevalence of a society steeped in clan warfare, and Rannoch and Balquhidder were notorious for being lawless districts in north Perthshire. Without doubt, however, the situation was more complicated than Marshall gave credit, as recently demonstrated for Rannoch and the Appin of Dull (Smout & Watson 1995; 1996).

Nevertheless there was an attitude amongst the nobility that the tenantry were profligate in their use of the woods. Typical of this view was that of the Earl of Strathmore, who wrote in the late 17th century of "a general humor in [the] commons who have a naturall aversione to all maner of planting and when young timber is sett, be sure they do not faill in the night time to cutt att the root the prettiest and straightest trees for slavs or plough goads " (Quoted from Whyte, 1979, 121). While not quite so condemning of their tenantry, the Campbells of Glenorchy appeared to share this view. Thus the 2nd Earl in 1721 made several references to the insensitive treatment by them of his woodlands. One valuable oakwood at Carwhin on the north side of Loch Tay, had been "miserably cut and

destroyed by the tenants" who would "have every place Common", while the pressure put on the woods around Kenmore by the nine or ten coopers cutting "every year several thousands of young oaks and ashes for gird (barrel hoop)" prompted him to require that henceforth none should be cut without a warrant (GD 112/16/10).

In Breadalbane, the loch and valley side woodlands were not the only ones to be subjected to the hurtful hands of the tenantry, for the woods of Kenknock and Badour, near the head of Glenlochay were "yearly destroyed by cutting them for the sheall houses". This was made worse because the tenants "burn the houses, and every year [need] new Timber, which [despite the].. Act of Court, they are obliged to build sufficient sheall houses and keep them up all winter". The Earl proposed no solution to this problem, which might suggest that although disapproving of this use of these high woods, he took a pragmatic view of the situation (GD112/16/10). He must have realised the difficulty of policing these isolated sheiling grounds, and settled for a compromise whereby the more accessible and commercially valuable woods on the lochside and lower glens were given priority over these scattered remnants. Indeed, such compromises appear to be a recurring theme in Highland woodland history.

Since the whole fabric of the tenantry's daily life depended upon a steady supply of woodland produce, concession for the use of the woods not only for sheiling construction in their summer towns, but particularly to meet their needs around their winter towns, was also required. Estates were well aware that to have completely forbidden the use of the woods would have undermined any measures devised and implemented to foster their care. Tenants were therefore often permitted the use of the less valuable timber, or timber from designated areas. Evidence for this system of customary usage is present in the Breadalbane muniments throughout the period, among which are the frequent references to tenants being permitted the 'black', 'brush' or 'barren' wood (non-commercial trees, usually birch, alder, hazel) from both within the more valuable oakwoods, and in woods apparently set aside "for the use of the Country" (McArthur, op. cit.). This timber was sometimes given *gratis*, but more usually for a cash payment, and occasionally in return for a service such as the stripping of the bark for the Earl's use. From the late 18th century onwards, much of this requirement was met from the weedings and thinnings of the extensive plantations, particularly those of Drummond Hill.

This did not, however, satisfy the needs of the tenantry, for damage and theft of trees remained a frequent occurrence, and a problem for the Earls and their

woodland managers for the whole of this period. Several mechanisms of control were therefore employed to discourage the illicit use of the woodlands. As already mentioned in Chapter One, one institution which served to regulate the use of woodlands was the Baron Court, where statutes were promulgated by the Baron Baillie giving clear instructions regarding what the tenantry could and could not do with trees. In Breadalbane, some early attempts were made at the regulation of woodland via baronial statute, as already been mentioned in Chapter One. Wood offences appear regularly in the proceedings of the Baron Courts which were utilised up until the 1830s for this purpose, despite the fact that after 1747 the power of the Baron Baillie, and the competence of his court, were greatly reduced with the abolition of heritable jurisdictions. It is not clear, however, whether a system was adopted in Breadalbane similar to the one demonstrated to have been in operation on the neighbouring Menzies lands of Appin of Dull and Rannoch in the late 17th and early 18th centuries. On the latter lands, with very few exceptions, everyone had to confess whatever wood they had taken, and would then pay accordingly in the form of a fine; thus affording the tenants their timber needs, and the Menzies landowner a nice little earner (Smout & Watson, 1995; 1996).

From a limited examination of the court books and tenants' petitions, it seems likely that there was a more genuine attempt at woodland conservation by preventing illicit cutting on Lochtayside, than has been found for the Menzies estates. Papers in the Breadalbane muniments reveal various mechanisms of control were adopted on Lochtayside. Thus a tack from 1672 requiring the lessee to "keep the woods", which while not very specific, is nevertheless indicative of early attempts to oblige the tenantry to take responsibility for the woods on their farms, and for the actions of their sub-tenants, servants and dependants (GD 112/10/8).

This method of regulation was still evident in 1797 when the 4th Earl issued a General Lease for Lochtayside. The lease included a clause threatening forfeiture of the lease without allowance for improvements, if a tenant was "convicted of cutting without liberty, or stealing wood or growing timber....and the informer if of good character and of ability for the delinquents possession will be preferred to it" (GD 112/10/2/2). This clause also serves to highlight the prevalence of a system of rewards and penalties, and indeed the social acceptance of informing on a neighbour. It is not clear whether there were instances of informants gaining possession of the farms of those they denounced, but in the late 18th century, tenants petitions to the Earl frequently concerned requests for possession of

neighbouring farms, usually citing the failure of the incumbent to provide sons or dependants as recruits for the Breadalbane Fencibles.

It has been suggested elsewhere that proprietors were loath to implement orders of removal, and it seems likely that Breadalbane was no different from other Highland estates in this respect (Lindsay 1974, 95). Although there are papers suggesting that orders of removal were issued for wood offences, there is no firm evidence that evictions actually took place for committing such offences. One such threatened eviction concerned the family of McLarens of Cambuscurich, on south Lochtayside. Their name appeared as tenants in that farm, and the other farms of that Officiary in 1769. It again cropped up in a series of petitions in 1794 where they defended themselves over the charge of stealing fir timber from a neighbouring plantation, for which they had been ordered to be removed. The probability that they managed to escape this harsh sentence is attested by a bid the following year by a Malcolm McLaren of Cambuscurich for the prized neighbouring farm of Achmore; previously held by the factor. The McLarens obviously continued to be a thorn in the side of successive woodkeepers on Lochtayside for, as late as 1830, Peter Young the woodkeeper for the west end of the loch, informed the factor, Robert McGillevie, of finding illegally cut birch on the McLarens farm, which he believed had been cut from the Cambuscurich enclosures. He suggested that they had been "a leading example to encourage both wood-stealers and poachers [and it was] now necessary to make some of them an example to deter others" (McArthur 1936, 76-81; GD 112/11/2/5, 10/2/2, 16/10/5). It would be tempting to suggest that this family might be described as an early example of 'the family from hell' given their troublesome history and crafty circumvention of the law, if it was not for the likelihood that such behaviour was probably rife in Breadalbane.

In terms of wood offences, however, the issuing of fines under the jurisdiction of the Baron Court remained the most common mechanism for regulating the use by the tenantry of the woods on Lochtayside during the period. It was also more usual for informants of wood stealing to receive monetary rewards in the form of a percentage of the fine collected from the miscreant. Whether the level of prosecution for wood offences remained constant throughout the period, or fluctuated perhaps in response to periodic campaigns against the crime, ineffectual woodkeepers, uninterested and distracted proprietors, or changes in the commercial value of the woodlands, is not clear. This is undoubtedly an area requiring further study.

The role of those employed to look after the woods was remodelled from time to time throughout the period, but it remained one of their responsibilities to detect those who committed wood offences. In the 17th and early 18th centuries, tenants were employed as "intendants", to maintain dykes around parks and woods, on or close to their farms, with payment being made with meal, merks and a percentage of fines (GD 112/16/10). By 1721, a woods overseer was appointed for Breadalbane and Glenorchy, but it is not clear how long this position lasted, as the engagement of several woodkeepers around the loch became more common. By 1794 there were fifteen woodkeepers employed in Breadalbane, nine of whom covered Lochtayside. Woodherds were also employed as their subordinates, with local responsibility for much of the manual work, i.e. repairing fences and ensuring that stock were excluded from enclosures. The woodherds, like the woodkeepers, were probably all local men, and were given crofts as part of their terms of employment. The presence, on at least one of McArthur's plans of the south side of Loch Tay, of a croft denoted "Tree Croft", close to the edge of Firbush Park, and a "Wood Croft" near to Acharn, suggests that it is not beyond the realms of possibility that this was the possession of the local woodherd (RHP 973/1). It is also likely that they had a similar function to the 'intendants' referred to earlier, for they also depended for some of their income on a share of fines levied as a result of their detecting wood thieves and trespassers.

This method of control and supervision of the woods, particularly where local people were employed in these positions, must have been susceptible to abuses and misconduct. Each individual, not unnaturally, would weigh up the choices open to him, and have to decide whether the rewards were likely to be greater than the risk involved in covertly selling timber, or being induced to turn a blind eye to offenders, who may indeed have been relatives. At the other end of the spectrum, it is possible that some wood officers adhered strictly to their duties, pursuing with evangelical fervour offenders, thereby maximising their remuneration through the fines.

There are indications in the Breadalbane papers that in the late 18th and early 19th centuries, aspects of both of these extremes were manifest in the woodkeepers employed on Lochtayside. During the 1790s and 1800s, when the 'natural' woods would probably have achieved their greatest value, Patrick Carmichael was woodkeeper in Killin. The 4th Earl issued very strict regulations regarding his precious woods. For example, in 1790 the Earl wrote a note in pencil on one of Carmichael's reports, "no trees on any part of the estate ought to be cut down without its stool being afterwards properly fenced" (GD 112/16/10/3). Is this the response of a proprietor who resents the pressure that his tenantry is putting on his

trees through their indiscriminate cutting, brought about by a lack of control exercised through his woodkeeper, being further exasperated by a woodkeeper unable to enforce his edicts? In a letter to Carmichael three years later the Earl begins, "I have ordered you to cut no more wood of any kind this year. If you do not attend to this order therefore you must take the consequences" (GD 112/16/10/3). It is possible that rather than being ineffectual, Carmichael was simply 'ploughing his own furrow'. Whatever the truth behind these commands, Carmichael continued in his role for several years to come. It is indeed unfortunate that the historian is largely denied the means of laying bare the character of such key players in the development of woodlands.

Around 1815 a new woodkeeper, Malcolm Macgregor, was brought to Breadalbane from Glenorchy. He very enthusiastically produced several long reports on the state of the woods on the western half of Lochtayside, Glendochart, Glenlochay and Edinample (Lochearnside), from which much can be learned about both his experiences and views, not to mention the views of the Earl, on woodland management. Macgregor's duties appear not to have varied significantly from his predecessor, Carmichael's, and he continued to be largely involved with the more abundant 'natural' woods of the western half of Lochtayside. There is evidence that he favoured a more interventionist form of woodland management and initially, tentatively, made suggestions for improving the woodlands. Later he more confidently advocated the removal of "rubbish", i.e., the non-commercial brush and barren trees, (in particular, birch, hazel and alder) from the more valuable oakwoods, and the "filling of vacancies" in the oakwoods with mainly oak, also larch and to a lesser extent Scots pine and silver fir (by this time planting beech had apparently lost favour locally) (GD 112/10/2). This was essentially a form of enrichment planting, which was probably the first sustained attempt at changing the composition of these woods in their history, and a response, as Lindsay suggests, to an increase in the value of oak produce (Lindsay 1974, 362). The use of exotic trees in both planting within natural woods, in small plantings or 'clumps', and in the policies, also indicates the contemporary desire to create aesthetically pleasing landscapes (SNH 1996).

Unsanctioned cutting in woods was still a problem, and an important aspect of McGregor's duties was to catch transgressors, who would be sent before the Baron Baillie, at the local court, which rather interestingly was referred to as a "Wood Court" in 1795 (GD 112/16/13/10). He found many injures to trees (including pine and alder), caused not just by trespassing livestock, but often by bark stripping (for example, dyeing was a commonly cited use for alder bark), as well as the taking of living and dead trees, and parts of them. Being an outsider

probably helped him in this task, though he was still occasionally confronted with attempts at bribery. Few incidences of attempted bribery were reported by the woodkeepers, but on one occasion Macgregor informed his superiors that a bribe had been left in his house, to induce him not to take a transgressor to court - a bottle of whisky! The offence in this case was removing ferns (probably bracken for roofing) from Parknacloich without permission; a practice which was increasingly viewed as detrimental to the woods, both because of the damage inflicted on the dykes, and due to the disturbance of game. In fact the 4th Earl eventually prohibited anyone from entering the wood enclosures, although this must have been a particularly difficult directive to police (GD 112/16/10/2).

This rather extreme regulation was largely in response to the increasing importance of game management. Roe and fallow deer, as well a range of woodland game birds, were becoming positively encouraged in woods and plantations, and indeed some of the woodkeepers duties started to coincide with those of the gamekeepers by the end of the study period.

Interestingly in the 1830s further changes were proposed in the supervision of the woods. The factor, James Wyllie, recommended in a memo alterations to the work load of both the ground and wood officers. This was essentially a move to rationalise the estate structure, and his view of the function of the reformed wood officer which he summarised as "the charge of woods, wood fences and superintendance of woodherds", had really changed very little since the early 18th century. His intention was to appoint a well-qualified man to cover all of the Perthshire estates, with woodherds being employed at either end of Loch Tay. This rationalisation was as much a response to the increasing specialisation of trades, including the increase in various skilled contractors, accompanied by a reduction in the use of estate employees for some of the woodland work, as the changing value of the woodlands themselves (GD 112/16/5/3).

What these changes emphasise is the, by then, established requirement for skilled practitioners, not only in woodland management, but also in estate management as a whole. It has been suggested that, as part of the drive for improvement and reorganisation of Highland estates, there was a desire to replace indigenous land managers with outsiders with specialist skills in silviculture and other forestry techniques. It is probably true to say that many of these incoming specialists can rightly be called Scotland's first professional foresters, and indeed published their accumulated wealth of knowledge which many silviculturalists today would be foolish to ignore (Monteath, 1824; Nicol 1799).

This development was also accompanied by more interventionist management of the coppice woods, and greater emphasis on the development of commercial plantation forestry, fuelled as ever by a commercial expedient. The changing role of those who were given the charge of the care and supervision of the woods are remarkably well documented in the Breadalbane muniments. Though their numbers and titles varied over the period of study, their core duties remained essentially unchanged. Whether or not the orders issued by the Earls were executed on the ground, as intended, depended very much on the abilities and trustworthiness of the woodkeepers. In the end, the decisions and actions of any individual, whether baron, woodkeeper or cottar, would always depend on their character; an indeterminate variable in the woodland history equation.

Utilisation of the Woodland Produce

One of the most important functions of the woodkeeper was the supervision of cutting , both in the enclosed and the open woods designated specifically for local use. It is therefore worth examining in more detail just what these uses were, and if the demands of the tenantry could have been sufficient to lead to their further decline. As already stated, the local population of Lochtayside, from landless servant to miller and tacksman, required the woodland produce for almost every aspect of their lives during most of the study period. Of course, their needs varied throughout this time, but while the rural economy essentially remained dependent upon a subsistence agricultural system, few people would not require a large assortment of agricultural implements, not to mention a roof over their heads and shoes on their feet. Only when the rural economy started to diversify (typified by the development of small rural service and industrial centres, where inhabitants became wage earners and relied less on agriculture), and transportation enabled more importation of goods into an area, did the huge dependence on woodland produce begin to slowly decline. This period was also marked by the increase in specialist tradesmen; whereas before many of the daily essentials of life were made on the farms by the people themselves.

The tenantry's greatest need for timber, particularly large timber, was for their houses. It is generally agreed that the basic type of house in the Highlands for most of the study period was the long-house, that is a long, low building, housing the farmer, his dependants, the livestock, and anything else requiring inside storage. There were, however, spatial and temporal variations in the standards of construction and materials used. Both documentary sources and archaeological field evidence have been used to reconstruct the general types of buildings in use at various times and in various localities, although it is accepted that this is made

difficult by the relatively few houses of the tenantry which have survived to the present day (Whyte 1979, 162; Stewart 1984, 60; Dodgshon 1981, 172).

Accounts by travellers and agricultural commentators from the late 18th and early 19th centuries do, however, provide useful descriptions of the condition of housing, and it is possible from these to discern some of the regional distinctions between those of the more prosperous southern Highlands, and the significantly more primitive condition further north (Marshall 1794; Heron 1793; Burt 1754; Pennant 1774). Again, the dangers of an unconditional acceptance of these descriptions must be noted.

One of the most useful descriptions of housing structure, comes from William Marshall, who knew Lochtayside intimately. He described in detail both the more primitive houses formerly widespread in the central Highlands, which still existed in more backward districts, and the modern form of farm building then more common in the central Highlands. He described the ephemeral nature of the formerly widespread "sod huts", and the recycling of materials, including roof timbers. In contrast, the modern houses were largely dry-stone constructions, with "feal" (turf) or sods still being used for the gables and ridge. His description of the roofing structure and materials used in its construction largely accords with contemporary estate records and modern-day studies. Thus he related that "the roof is set on with 'couples' or large principle rafters, stept in the walls two or three feet above the foundation.....upon these couples, lines of 'pantrees' or perlines [purlines] are fixed, and resting on these rough boughs...are laid, rafterwise, and termed 'cabbers', formerly wattled....upon these 'divot' or thin turf, laid in the manner of slates; and upon this sod covering, a coat of thatch composed of straw, rushes, heather or fern" (Marshall 1794, 19-21).

Heron, writing around the same time, was less impressed with the tenantry's houses, which he described as "poor and mean"; however, he did see signs of "more snug and commodious" looking houses and steadings near Killin, and in that village itself, he found houses "well built with stone and lime [which had] joists laid with fir and birch rafters" (Heron 1793,253, 256, 273). It is obvious from the estate records that upgrading of farms on Lochtayside was a gradual process, perhaps facing the unconscious resistance of an inherently conservative population, and evidently Heron and Marshall visited the district during this upgrading process.

Neither commentator gave accurate indications of the dimensions of the houses, either old or new, or of the amounts of materials required, though recent research

on the neighbouring district of Balquhidder, largely based on estate records, has revealed more details of the amounts of timber and other materials used in mid-18th century house building (Stewart 1984, 49-61). One account relates to a house rebuilt after a fire in 1762 which required 8 couples, each in turn requiring 8 pantrees for the basic framework. This produced a 9-bay longhouse, including stalls for the cows within the house, with a further requirement of timber for two doors, three windows and cabbers.

Dimensions must have varied, however, depending on status and time period, for a long house with cruck frame, currently being renovated and investigated at Moirlannich, near Killin, with only five cruck frames, is a much smaller structure than the one described at Balquhidder (Mills & Crone 1996). Unfortunately, for a variety of reasons, current dendrochronological analysis of the structural timbers of Moirlannich have been unable to give absolute dates for the timbers. However, it is possible that the smaller house dimensions may be indicative of the removal of the byre to a separate building, therefore requiring the construction of a smaller human habitation, around the late 18th and early 19th centuries. This might be further substantiated by the presence of a clause in the General Lease of Lochtayside in 1797 which stipulated the dimensions required of new housing, these being much smaller than those described for Balquhidder.

Results from the Moirlannich project have also revealed the range of tree species employed in the construction of the building. Ash was by far the most common timber used for the crucks or couples, with elm and sycamore also being used for this purpose. Ash was also used in other elements of the roof frame, while pine was used for the pantrees or purlines. This largely supports the documentary evidence from the Breadalbane estate records, although birch was also a common tree sold, and indeed pilfered, for this purpose.

Farm buildings were not the only local user of large timber, and other buildings such as school houses, manses and mills required a not insignificant amount of timber for construction and repair, as well as for the mill machinery itself. Again, ash and sycamore appear to have been used on Lochtayside, but also fir which, throughout the 18th century, was brought into the district (from Rannoch and Glenorchy) for school and manse construction. Oak, always the most precious of trees, and therefore seldom used in farm building construction, was also provided for the construction of mills and other important buildings (GD 112 - /15/200, 14/13/5, 15/471, 15/458).

Another significant requirement for timber on Lochtayside was in the construction of bridges. Pennant was evidently impressed by both the roads and bridges of Breadalbane which, he pointed out included 32 bridges erected by Lord Breadalbane, on the north side of the Loch alone (Pennant 1774, 89). It is not clear how much timber would have been required for these bridges, since it would depend on the proportion of them that were constructed with a superstructure of timber resting on stone piers, similar to the one built in 1706 at Balquhidder, as opposed to those build entirely of stone, but still requiring timber of smaller dimensions during construction for scaffolding.

Road and bridge building were certainly embarked upon with vigour by the 3rd Earl of Breadalbane in the middle decades of the 18th century, and it is likely that timber, stone and a combination of these materials were used, most likely depending on the technical factors. For example, the bridges constructed in Lawers officiary in 1743 were built of timber, as was the bridge over the Dochart at Killin in 1705, although the latter would most probably have required stone piers given the flow at this point on the Dochart (GD 112/15/286). However, towards the end of the 18th century, stone was probably the most ubiquitous construction material used in bridge building, and once these substantial structures were completed, like those crossing the Tay at Kenmore (1774) and the Wade bridge at Aberfeldy (1733), they endured for much longer than any timber structure.

Finally, it is worth mentioning domestic boat building as a user of large timber. Again oak, both crooked and straight, seems to have been preferred for the hull, with its use for this purpose being sanctioned by the landowner. Of course, boat building on inland lochs such as Loch Tay might not have been quite so important a user of local timber reserves than on the coast and sea. Nonetheless, given the difficulty of land transport in the Highlands for much of this period, it is likely that several boats of various sizes would have been carrying people and goods around Loch Tay. This is borne out by the frequent references in the estate records, particularly in the late 17th and early 18th centuries, to boats being built at a number of locations around Loch Tay which were then being used as ferries, timber and stone carriers and fishing boats. Even as late as 1799, a boatwright at Ardeonaig was given permission to obtain oak from the Cloichran woods for building a boat (GD 112/15/-172, 271, 286).

The uses for small timber, brushwood and other wood produce, are almost infinite, and have been well documented by others (Lindsay 1974). Probably second only in importance to the provision of house timbers, was the requirement

of timber for farming implements and tools. Ash was by far the most important timber for many farming implements, and has been referred as the "husbandsman's tree" (ibid., 112). Iron seems to have been both scarce and expensive in the Highlands, and wood was often substituted. The very presence of 9 or 10 coopers in around Kenmore alone, in 1721, gives some idea of the amount of barrels being produced in the district, both for use in the export of Loch Tay salmon, and for local use as vessels for the storage and preservation of butter, cheese, corn and various liquids such as ale and whisky. By the 1790s, when the ministers produced their statistical accounts of their parishes, there were still eight coopers in Kenmore, and a distillery in Killin (OSA *XII*, 467, 480).

Wheeled transport had little place in the old Highland economy, and transportation of goods, both locally and outwith a district, was normally by pack horse, or perhaps by tumbler; a primitive 2-wheeled cart with solid wheels and rotating axles (Whyte & Whyte 1991, 176). Another common means of transporting goods, particularly peats on difficult terrain, was the Highland sledge which, was composed of two sapling trunks as a frame with a light superstructure (rather like those used by North American indigenous peoples). Again, references for all of the above mentioned uses of timber can be found within the Breadalbane muniments, both in the accounts of timbers sold to the tenants, and in the lists of those fined for wood offences.

Accounts for the sale of timber to the tenantry of Lochtayside can often be found during the 18th century, and frequently record the use that was going to be made of an item or lot; thus some of the most commonly required items identified in these accounts were cabbers, couples, trams, axles, plough beams or harrows (GD 112/15/-200, 471). Meanwhile as part of the documentation of those found guilty of wood offences, a description of the purpose to which a stolen item was put, is often given, revealing some of the more interesting uses for wood products. These include; alder for cabbers, birch for hand barrows, fir for fencing corn and for 'dealls' (sawn timber planks), hazel for firewood, young oak for byre construction, ash for corn stacks, hoops and carts, oak for slade (sledge) rungs, and even ash for shinty sticks (GD 16/10/5).

Some of the smaller items that would normally be found in any 18th-century Highland farm house do not, however, appear very often in the estate records, such as baskets for carrying peat and manure, ropes fashioned from birch and willow widdies (slender pliant branch) used for harness and trace, the use of hazel, and wooden eating utensils and vessels. There are two possible explanations for this. Either since they do not appear in the lists of wood offences, the materials

required for their construction may have been procured freely, or perhaps more likely, they were made with the left over material used in the more substantial artefacts already accounted for in the accounts and lists of thefts.

Until the end of the 18th century, lots sold to the tenants of Lochtayside and surrounding districts, tended to be small, probably for individual domestic use, and although there were obviously specialised craftsmen around during this period, such as the boatwright and shoemaker, it is likely that specialisation increased, and more and more of the needs of the local farming population were being met by the tradesmen that populated the developing villages such as Kenmore and Killin. This is particularly evident from the roup rolls of wood sold in the period between 1790 and 1850, when larger amounts of timber were being sold to fewer people, who tended to follow specialised trades such as sawmillers, wheelwrights and cabinetmakers.

Timber and wood were not the only products of woodlands utilised locally, and certainly was not always the most commercially valuable commodity. Bark, which will be discussed in more detail later, was used in domestic tanning which was universal in north Perthshire up until the late 18th century. A variety of species was used for this, and although oak bark was preferred, its commercial value resulted in the bark of other species being used, such as birch, willow and rowan (Marshall 1794, 24; Robertson 1813, 265-6).

Evidence that small amounts of bark were being used by the local population can again be found in the woodkeeper reports and roup rolls. One account for the sale of brush wood and trams sold between February and November 1786 includes numerous small amounts of bark sold by the stone (sales being concentrated in the summer, but also right through to November), to people from as far away as Aberfeldy, Fortingall and Strathbraan (roughly a 15-18 mile radius). There was no indication of the species from which the bark was taken, but since the bark was being sold with brushwood and trams, it may be supposed that it was not oak bark. Furthermore, there is no indication that there were professional tanners in the district (the nearest being Dunkeld and Crieff). However, in the 1790s it was reported that in Kenmore and Killin parishes there were 36 and 18 shoemakers respectively (OSA *XII*, 479, 483).

Lists and reports relating to wood offences also periodically make reference to trees being cut and or stripped for their bark. Among these references, alder and pine were frequently the trees sought for their bark. While it is uncertain what the pine bark was being used for, a number of the references to the illicit cutting and

stripping of alder suggest that tanning was not its principal use; rather it was an important source for dyemaking. Indeed, alder boasts four colours; a tawny red in the bark, a pinkish fawn in the greenwood, a green in the catkins, and a yellow in the young shoots (Mabey 1983, 22). In addition, when copperas is added to the aforementioned red dye, a black dye is produced (Edlin 1974, 168). It is no wonder that alder was worth stealing, for it alone might produce a very colourful tartan plaid.

The practice of collecting twigs and leaves as fodder for domestic animals is well documented for Scandinavian countries (Austad 1988, 11). Lindsay provided some evidence that leaves, particularly from holly, were used as fodder in parts of the Highlands (although he found none for Perthshire), and there is a reference for this use as far north as Durness in 1723 (Lindsay 1974, 119; Mitchell 1906-8). Rather surprisingly, given the level of dependency on woodland produce by Highland society, no references alluding to this form of utilisation have been found in the Breadalbane muniments. That the reasons given for wood offences (including cutting parts of trees), did not include for fodder requirements, must cast some doubt on the presence of such a practice on Lochtayside. On the other hand, there must surely have been a pressing need to accumulate winter fodder, for the leanest period of the year, when starvation often reduced cattle stocks, and since both domestic and wild herbivores will browse seedlings and saplings, and are known to have clear preferences for certain particularly palatable species, such as ash, aspen and rowan, it must remain a possibility that leaf fodder was utilised by the Lochtayside tenants.

There was also a lack of evidence among the papers examined in the estate records for the use of Scots pine or bog timber (i.e. wood buried in peat), yet it is generally accepted that these materials were widely used to make candles (Lindsay 1974, 122-3). This dearth of references may, however, be explained by this study's focus on the valley woodlands of Lochtayside, rather than on the upland fir woods and sheiling practises. It is therefore quite probable that in Breadalbane, the use of bog timber and manufacture of 'candle fir' was prevalent (Bil 1990, 222).

The Effects of the Non-Commercial Uses of Woodland Products

It is difficult to quantify the extent of the aforementioned uses of woodland produce, and how far this form of utilisation had an effect on the condition and extent of the woodland resource of Lochtayside during the study period. Records of sales and grants of timber are intermittent, and to what extent the numbers brought to court reflects the amount of illegal cutting cannot be determined. In addition, as already mentioned in Chapter One, evidence for the activities, and in

particular, the attitudes of the local population, is difficult to access because of the oral-based nature of their society. It is clear that wood was an essential resource for the local tenantry, and that they were prepared to pay for it, either in kind, or using their limited reserves of cash, and if necessary they would steal it, in order to meet their requirements. Evidence for the careful use of woodlands by the tenantry is less obvious, and a detailed examination of their attitudes and practises with regard to woodland, would greatly enhance the understanding of this aspect of Highland woodland history.

That apart, during the period, it is possible to discern a number of variables operating on Lochtayside, which had a bearing on the pattern of domestic utilisation of the woodlands. Above all, it is important to recognise that the socio-economic system operating in the Highlands was undergoing major change, particularly during the 18th century with the development of a more overtly market-based economy. Consequently, every aspect of rural life in the Highlands was being affected, including the utilisation of the woodlands. The most obvious manifestation was the increasing value attached to some woodland produce such as tanbark.

Until the early 18th century, the Campbells of Glenorchy's involvement with commercial utilisation of their woods appears to have been opportunistic, rather than a serious attempt at producing a sustainable crop for external markets. While this was the case, the tenants use of the woods could not have been seriously constrained by commercial demand, and the care and utilisation of woods appears to have been governed by an unwritten code of practice, based on privilege, and regulated by baronial statute. With the advent of commercial demand, in particular for tanbark, these arrangements were likely to have come under pressure to change. It is difficult to pinpoint the actual chronology of this progression occasioned by the development of market principles in the Highland rural economy, but an indication is given by a petition in 1722 from the tenants of Ardtalnaig for the reinstatement of their "allowance to cutt as much timber in my Lord's woods' as would uphold our buildings and sheallings" (GD 112/11/1/1/19). Thereafter, for the most part, the local population were required to purchase timber and bark.

As the economic value of the woodlands increased, particularly towards the end of the 18th century, stricter controls were established for sales and grants of wood to the tenantry. Thus in 1800 a series of instructions were issued to the woodkeeper, Patrick Carmichael, relating to the tenantry's use of the woods. Not only did the 4th Earl direct which woods would furnish the tenants requirements, and the types

of timber to be cut, but he also declared when cutting should take place. He also required the woodkeeper to keep accurate accounts of the quantities of timber provided to the tenantry, specifying the purpose for which it was intended, whether it was paid for, or given *gratis,* and what price it was sold for. Furthermore, an advance list of tenants requirements was to be given to the Ground Officer in each Officiary which would be passed to the woodkeeper, who would then personally supervise all cutting, and ensure that no damage was done to the dykes (GD 112/16/10/3).

These instructions, whether carried out or not, illustrate the lengths to which the Earl felt he needed to go to in order to preserve his woods. Moreover, his remark in one of these sets of instructions, that his tenants should pay an "adequate" price for timber because in his opinion, "when they get it too cheap they are apt to take more than they require, and to be careless of what they get" also reflects his concern that his tenantry were wont to be profligate (ibid.).

Both profit and prestige were undoubtedly important motives behind these tight controls, but the Earls of Breadalbane, in common with many other Highland magnates whose power base was founded on land, were careful not to neglect their most important source of income - rents. The 4th Earl, like his predecessors, and contemporaries, was keen to progress agricultural improvements on his estates. This would not only enhance his reputation, but more importantly it would attract greater rent yields. As already indicated, part of this drive for increased profitability included the remodelling of farm houses and associated buildings, since modern farms would attract higher rents. Probably as an incentive in persuading his tenantry to rebuild their farms, construction wood was provided free. Such a decision must surely suggest that the Earl was prepared to forgo some potential income from his woods in order to advance agricultural modernisation and hence his rental income. This policy is further emphasised in a comment made in 1800 by the 4th Earl, when he stated that "now that the agricultural improvements on my estate are fairly launched I call for very particular attention to my woods and a regular and judicious system must be adopted both to encourage their growth and to make them profitable" (ibid.)

This seems a rather over-optimistic view of the state of improvements on Lochtayside, particularly as this policy of allowing tenants free wood for building new houses was still in evidence in the 1830's, although by then it was only to be given for use in permanent fixtures, but could be used in the repair of existing houses rather than just for new building (GD 112/16/5/3).

The 4th and 5th Earls, like their neighbours in Atholl, benefited from the early interest shown by their ancestors in plantation forestry. At a time when the coppice woods were at their most valuable, and the potential for conflict was heightened between domestic requirements and commercial expediency, the plantations around Kenmore, and in particular on Drummond Hill, which had been progressively augmented since the middle of the 18th century, were becoming productive. These plantations were increasingly able to meet local timber needs from weedings and thinnings, without reducing their commercial potential. Indeed, reliance on these woods was so significant that in 1800 the Earl ordered that the timber requirements of the tenants of the west end of the Loch and Glenlochay should be met from Drummond Hill, and he would even allow them to use his carriage boat to transport it back up the Loch (GD 112/16/11/3).

It is tempting to conclude therefore, that the system of woodland regulation adopted on Lochtayside, combined with the availability of timber from sources other than the 'natural' woods from the late 18th century onwards, helped to minimise the exploitation of these woods. Furthermore, at least as far as local utilisation of woodland products is concerned, while accepting the detrimental effects of illegal practises, the potential for adversely affecting the regenerative ability of these woods was countered by strict controls and alternative timber sources.

It is probably not that clear cut, however, for a number of other factors were at play during this period which had a bearing on the non-commercial use of the woodlands. Closely allied to the changing economic system was the population increase experienced in the Highlands. The population on Lochtayside rose steadily during the latter half of the 18th century, and unlike the north and west Highlands, peaked around the turn of the century (See Figure 2). Over the same period, coppice woodland became increasingly profitable, resulting in a reduction in woodland area available to meet this increasing local demand (Lindsay 1975c, 48). It might be expected, therefore, that this would have resulted in a shortage in material for local use but, a number of other factors might have offset this situation. By the end of the 18th century, transportation was becoming better developed, resulting in somewhat less dependence on local materials. Also, as already discussed, increasing specialisation by professional tradesmen may have resulted in less wastage, particularly as they relied for their livelihood on the production of goods, the raw materials for which had to be paid for (Lindsay 1974, 415).

The judicious planting which had taken place on Lochtayside had undoubtedly eased the supply situation, particularly with regard to the rebuilding of farms. Above all, areas of brushwood, as identified by the 1769 Survey, which would be difficult to convert to oak coppice, in conjunction with the pressing need for winter grazing, combined to exclude a not insignificant proportion of woodland from enclosure and a coppice regime. It seems that it was largely those unenclosed woods, alongside the plantations, that met local needs. They were concentrated in the south-east portion of the lochside, with a particular focus on the Wood of Callelochan which, in 1769 comprised 100 acres of mainly birch alder and hazel (RHP 974/1-2). These were the woods, perceived as being only good enough to supply the tenantry, that probably bore the brunt of exploitation. Comparison of the 1769 Survey and the 1st edition OS map of 1861 supports the supposition that those woods which had been enclosed by the time of the 1st OS, do not appear to have been exploited for local timber use, unless they were plantations. Of course, by 1861 a number of woods remained unenclosed. While they might have been used for domestic timber needs, the majority of them were being utilised, not for their products, but for their pasture and shelter values.

The Utilisation of the Woodland Area

Deciduous woodland has the ability to withstand repeated cutting and, indeed, to a degree browsing (although not all species to an equal degree), for most deciduous trees will produce repeated crops of shoots from adventitious buds, following cutting. Woodland management systems based on coppicing and pollarding utilise this characteristic. This propensity for regeneration cannot have gone unnoticed by the indigenous people of the Highlands, and it must remain a possibility, despite the lack of evidence, that they implemented methods of protection for regenerating stools. This was, however, above all, a pastoral society, dependant on livestock; predominantly cattle in the 17th and 18th centuries, though goats and horses were also important, and increasingly on sheep from the late 18th century onwards.

Woodland management and pastoral farming are fundamentally incompatible, since, put at its simplest, shade tends to encourage a herb- rather than a grass-dominated sward, and grazing animals will browse young trees. As a result, the denser the woodland canopy, the less nutritious the pasture will be, while the more grazing animals pasturing in a wood, the more difficult it becomes to regenerate the trees in that wood. This conflict, which of course is not unique to the Scottish Highlands, had to be resolved by reaching some form of compromise (and indeed it is still a fundamental problem today). It has been suggested that this was achieved by the modification of the form and scale of one or both management

systems, not just in highland Perthshire, but also in those other parts of the Highlands, where there remained significant areas of natural woodland in the post-medieval period (Lindsay 1977a, 31). Modification would depend on the value of the commodity at any particular time and, as ever, on the attitudes of the individuals involved in the decision-making process.

It is neither possible, nor appropriate, to discuss fully all aspects of Highland agriculture within the confines of this work. However, in order to understand the influences acting upon the decision-making process involved in achieving this compromise, a brief account of key aspects will be given. A considerable body of research exists covering the Highland rural economy during the post-medieval period (e.g. Gray 1957; Dodgshon 1981; Richards 1982). It is probably fair to say that considerable regional variations existed within Highland agriculture, and Lochtayside is therefore likely to have exhibited its own unique blend of agriculture and forestry. Some common features also applied, and these will be briefly described.

While it is generally accepted that the majority of the Highland population during this period were basically pastoralist farmers, crop growing, based on the infield-outfield system, provided them with their means of subsistence (Dodgshon 1988, 139-51). Animal husbandry involved cattle, the sale of which provided tenants with their principal source of money for rent, while sheep, goats and hens were kept for household subsistence, and at least until the mid 18th century contributed to the victual rent. In addition, horses were an essential component of the farming system, being used for ploughing and carriage.

This system was never really static, and forces of change were continually affecting the orientation of the Highland farm economy. Thus in relation to animal husbandry, two significant changes took place which altered, to a greater or lesser extent, the relationship between animal husbandry and woodland management. From the early 17th century onwards, the cattle trade increasingly became an important part of the rural economy, opening it up more to market influences, and thereby raising the value of pasture. Cattle prices fell at the end of the Napoleonic Wars, but by then a new form of sheep husbandry, based on hardy, Lowland breeds and introduced in the latter part of the 18th century to parts of the Highlands, was in the ascendancy. This was not only incompatible with woodland management, but it also conflicted with traditional Highland agriculture, and had major repercussions for both.

An integral part of the traditional Highland pastoralist agriculture was the practice of transhumance, a system also widespread in many pastoral areas of Europe. This system allowed land above the head dyke, including the extensive upland grazings, to be utilised for part of the summer, while crops were grown on the low ground. These movements were strictly controlled by baronial statute, so in 1631 for example, the Glenorchy Barony Court book declared that all stock was to be "outwith the head dyke from the 1st of May and from the 8th day of June to pass to sheilings" (Dodgshon 1981, 168-9). While this form of agriculture prevailed in the Highlands, so too did the practice of moving livestock to upland grazings during part of the summer, and it is known that in Breadalbane this practice continued at least until the end of the 18th century (Marshall 1794, 31, 42; Campbell 1910, 48). This use of the uplands, where not only cattle and sheep were grazed for part of the summer, but also large herds of semi-feral goats and horses, at least until the end of the 18th century, must have made a major contribution to the loss of woodland in the uplands.

During the winter the animals were brought down to the lower pasture and meadows, with some of them being wintered indoors. It is largely accepted that winter capacity determined the total number of 'soums' allocated to a farm; that is the number of animals which tenants or landowners could graze on an area of pasture (Whyte 1979, 271). Furthermore, it has been suggested that more animals were wintered than could be adequately fed, thereby increasing the pressure on the winter pastures (Lindsay 1977a, 25). The 'Improver' movement clearly despised the use of sheilings which involved a "train of evils" and were keen to do away with the practice (Marshall, 1794, 31). Allied to this, was its incompatibility with, and eventual subordination to, the use of upland grazings for sheep farming. Its discontinuance was also said to be affected by its incompatibility with new arable farming practices, in particular, the introduction of flax and potatoes (ibid., 45)

It is clear that much of the preceding, rather broad and necessarily superficial account of Highland agriculture, was reflected in the situation on Lochtayside during the study period. Much has been learned, not only about the form of agriculture adopted on Lochtayside prior to the Improvement era, but also about Highland agriculture from information gleaned from the Breadalbane muniments, and in particular the 1769 Survey of Lochtayside. It reveals not only the idiosyncrasies of agriculture in this part of the Highlands, but also the differences between one side of the loch and the other.

Lochtayside was probably more suited to cultivation than many parts of the Highlands. Its soils largely overlay base-rich rocks, and although steep and rugged in places, this is countered in part by a reasonable depth of soil. Despite this, it has been suggested that relatively little of the land was ploughable, and comparatively large stocks of animals could be and were supported (MacArthur 1936, *xlvii-xlviii*). Furthermore by 1769 most of the land which could have been cultivated had been, although there are some indications that some land, formerly under cultivation, had become neglected, perhaps because it was too wet or rocky (ibid., 18, 22). As already discussed in Chapter Two regarding Finlarig, this may also have been due to a increasing emphasis on livestock.

Besides the arable land, there was the meadow land from which hay was cut for winter fodder. This was inferior, being either too wet, stony, or full of bushes. Indeed, some of these areas may well have supported not inconsiderable areas of woodland (ibid., 35; RHP 973 1/2). The pasture land also frequently supported scattered trees and bushes, though at what point a woodland with pasture became locally regarded as pasture with wood or scrub is unclear, although McArthur obviously attempted to make this distinction (ibid.; Lindsay 1974, 163). According to Marshall, this was where the cattle were pastured in the summer, and sheep in the winter, although the cattle might also be taken above the head dyke during the day in the summer and brought down for milking in the evening, and housed during the night. Young cattle were mainly kept on the sheiling ground for six or seven weeks in the summer (Marshall, 1794, 45).

McArthur's survey report for the south side of the Loch also included an account of the livestock on the farms, which included cows, sheep, goats and horses. Thus, on the south side in 1769 there were 1,426 cattle; 5,332 sheep; 736 horses; and only 198 goats. The latter, which are particularly destructive in woodlands, were by then declining, perhaps as has been suggested for the very reason that they were so incompatible with commercial woodland utilisation (Bil 1990, 162-3). Although the number of sheep was nearly four times that of cattle, it must be remembered that these were the small Highland breed of sheep, which required much less food than a cow, while the cattle were much more valuable than the sheep.

By the 1790s changes were afoot on Lochtayside. Although critical changes were made in the system of cropping, particularly with the introduction of the potato, probably the most striking shift in emphasis was in the stocking patterns. Blackface sheep had been introduced from the Lowlands, perhaps as early as the mid-18th century (OSA *XII,* 486), but it was only towards the end of the century

that their numbers started to increase substantially (See Table 1). A recent study of the Morenish district of north Lochtayside provided an indication of the re-structuring of the stocking composition between 1773 and 1783 (Bil 1994, 14-15). Thus, the number of sheep increased from 547 to 918 animals, while cattle numbers fell from 300 to 251. Although there appears to have been a slight decrease in sheep numbers in 1805 (705 animals), by 1854 the Morenish district, west of Tomachrocher supported 2,000 cross bred sheep, with only 15 cows and their followers (ibid., 15).

Table 1 Stock Numbers on Lochtayside

	Kenmore parish		*Killin parish*	
	1795	**1838**	**1794**	**1843**
Black cattle	3,028 (breeding)	3,109	1,780-1,800	1,138
Sheep	11,480(excl.followers)	12,050	26,000-27,000	30,290
Horses	926	521	400	200
Swine	-	500	150	250

Source: OSA and NSA

While these figures would be unlikely to have been mirrored throughout the whole of Lochtayside, there being considerable internal variation in stocking levels, the trend was nevertheless obviously representative of the whole, as can be seen from Table 1. Morenish may have been one of the few farms to have gone over completely to sheep farming since, according to Marshall, "sheep farming [was] yet confined to the heads of glens where the vallies are narrow, and the hill lands extensive" (Marshall, 1794, 32). This impression very much corresponds with the stock number figures of the Statistical Accounts, which indicate that by 1794 substantial numbers of sheep were being kept on farms in Killin parish. This is a parish which extended as far as Tyndrum, 20 miles west of Killin and included some relatively inhospitable terrain, not at all suited to arable farming. Only an eight mile section of the south side of Loch Tay was in Killin parish, while Kenmore parish covered the bulk of the lochside.

Wedder production (castrated lambs) was the main element of the new sheep farming regime, with wedder stocks being pastured on the hill grazings in the summer, and brought down to the low ground in winter, while breeding ewes remained on the lower pastures throughout the year (Lindsay 1977a, 26-7). The reorganisation of the livestock regime required changes in the traditional form of Highland husbandry, which resulted in the small tenants being progressively squeezed out of their customary pasturing grounds.

Lochtayside was already losing its population in the first decade of the 19th century, so the social and economic problems precipitated by these changes were probably not as acute here as in some other parts of the Highlands, where the population continued to increase during the first half of the century. Nevertheless, the effects of this massive increase in sheep numbers, at a time when enhanced commercial values for woodland produce had increased the number of enclosed woods, may well have concentrated the pressure on the less valuable woods on Lochtayside.

It has been suggested that grazing has been one of the most significant single factors affecting woodland in the central and western Highlands (Lindsay 1974, 192). There is no doubt that grazing animals can potentially be very destructive in the woodland setting, though the extent to which they were allowed free rein to wreak havoc in woodlands, is less clear. It is fairly well known that livestock movements were strictly controlled, but to what extent the woodlands were exposed to uncontrolled grazing, particularly in the winter and spring, when young growth was at its most vulnerable, is less clearly understood.

The herding of stock in Scotland appears to have been customary, and many touns had imposed on them statutes enacted through the local Baron Courts, or stipulations in tacks, controlling winter grazing by the employment of a 'common herd', in the 17th century at least (Dodgshon 1981, 168). In fact, in 1686 an Act of Winter Herding was passed by Parliament, presumably in response to concerns over unbridled grazing by livestock during the winter. Whether this practice of common herding was widespread in the Highlands is less clear, for it has been suggested that in some parts of the Highlands, cattle at least were maintained solely by pasture during the winter, and not brought indoors at all (ibid., 306-8). Whether this was the case for Lochtayside is uncertain but Marshall, writing at the end of the 18th century, was critical of the lack of enclosure, and where it did exist, its inability to exclude sheep "which still overrun the country during the six months of winter, when the entire district may be said to lie in the most perfect state of common" (Marshall, 1794, 16).

Lack of enclosure might not necessarily result in livestock having full range of the district, however, and there are indicators that herds continued to be used on Lochtayside. In a 1700 rental, reference was made to the "Park Crofts" being allowed for the "Common Herds" (GD 112/9/7/5). The bestowing of such crofts appears to been particularly associated with the environs of Taymouth. This might be indicative of the adoption of stricter controls around the principal seat of the landowner, and may not have been a widespread practice on Lochtayside,

except perhaps around Finlarig or Lawers. On the other hand, crofts were generally granted by tenants or tacksmen and would therefore not normally show up in the estate rentals.

Further evidence for the existence of herds is found in the 1769 Survey. On the combined lands of Succoch and Tomour, which by 1769 was an exceptionally large grazing farm with modern farm buildings on the south side of the Loch, there was a building enclosed by a dyke called "Herd's croft", adjoining which are three enclosed acres on Succoch called "Herd's Park" (McArthur, 1936, *xxviii-xxix*). Again, this was a particularly modern farm, incorporating enclosed parks, and therefore may not have been representative of Lochtayside farms as a whole. These crofts may therefore represent the employment of full-time herds associated with improved farming, while the more widespread practice of herding may have been a chore for the children.

Another type of herd did of course exist, and has already been discussed. Woodherds may, however, never have been associated with livestock; the use of the word 'herd' in this case, may originally have been employed to suggest a man employed to tend woods rather than livestock in woods. That part of a woodherd's function which was to ensure livestock was not damaging a wood was likely to have been his sole connection with livestock control, and a function which became increasingly important, as woodland became more highly prized. It is clear that a greater appreciation of animal husbandry on Lochtayside would help clarify the extent to which the woodland around the winter, and indeed, summer towns, was put under pressure by the requirements of livestock, particularly in winter. Further examination of the Breadalbane Baron Court records would be particularly useful in this context.

If, as has been suggested, cattle were only herded in the growing season and harvest, the potential for them to reduce significantly the regenerative capacity of a wood must have been great (Lindsay 1974, 142). However, it is possible that the tenantry did not utilise the woods very efficiently for winter pasture and shelter. This was obviously the view of McArthur who, in 1769, noted in his survey of Easter and Wester Tullichcan: "Was the tennents so wise as keep the lower part of the woods for the winter season it would be of great advantage to their cattle, but I observe that the common course of the country is to take the best and leave the worst as they have a throwgh-bearing [means of subsistence] that same way" (McArthur 1936, 83). McArthur was particularly concerned with the poor quality of some of the meadow and pasture lands, and viewed almost all the woodland on the south side of the loch as a constituent part of animal husbandry.

This attitude is understandable, because he was brought in principally to survey the estate with a view to furthering agricultural improvements, but it may also have been because the majority of woodland on the south side, in 1769, was being utilised solely to meet local timber and pasture needs. Since there appeared to have been no history of woodland enclosure on the south side, except on the lands of Achmore (see Chapter Two), and given that the commercial value of tanbark had not yet undergone a significant improvement, allied to the relatively less abundance of oak on the south side, it is not surprising that enhancing the productivity of cattle, and other livestock, was viewed as the best option for improving the estate (and therefore its rental value).

Farquharson, in surveying north Lochtayside at the same time, was faced with a rather different set of circumstances. Woodland, not just around the former baronial seat of Finlarig, but also elsewhere on this side of the loch, had a history of enclosure going back at least until the early 17th century. These woods appear to have been more dominated by oak, and had been taken care of for some time. He obviously recognised their value, and even suggested enclosing some (ibid., 25). Nevertheless, like McArthur, he was essentially an agricultural surveyor, and assessed many areas of woodland as meadow and pasture. For example, in describing the farm of Stroan-Fernan, he commented that "there is besides a great deal of hazel, alloers (alder) etc. but as these seem not to be regarded as wood I have included them in grass" (ibid., 57). Is this the view of the tenantry who want them regarded as 'common' pasture, or of the landowner who was only really interested in oakwoods? Interestingly, Farquharson did not acknowledge the existence of any woodland on the neighbouring farm of Boreland, and yet a stipulation in its lease in 1776, entitled the Earl to take what timber he wanted from the woods, without compensation for any damage. The tenant was also prohibited from pasturing any cattle within the fences of the woods for the first five years after they were cut (ibid., 56).

There is little doubt that like the produce of the woods, the area taken up by woodland was an essential resource for the local population. For this reason, it may be suggested that they would be unlikely to have viewed sympathetically any attempts by their landlord to exclude stock in order to regenerate a woodland area, particularly if it was composed predominantly of 'barren' timber. It may be an exaggeration to say, as one 18th century commentator did, that "tenants look upon trees with an evil eye as productions in which they have no interest", but since they had neither rights nor control over the trees in a woodland, or elsewhere, there may well be more than a fragment of truth in this statement (Allardyce 1888). That is not to say that the tenantry did not see the worth in trees, or

appreciate their aesthetic value, rather in such a paternalistic society, they had little choice but to accept the will of their landlord, and if they got some recompense for looking after a nearby wood, then so be it. On the other hand, if necessity prompted them to disobey regulations, and allow their livestock into a forbidden wood, then that chance would have to be taken.

Among the acts and proceedings of the Baron Courts under Glenorchy Campbell jurisdiction, there is an order from 1621 that "evirie persone haveand landis within the boundis befoir mentionat [those of the Campbells of Glenorchy] salbe forrester of the woodis thairof and be ansuerable to the Laird for the samyn" (Innes 1855, 355). As already mentioned in Chapter One, Sir Duncan, the 7th Laird of Glenorchy, appears to have been an early advocate of rural improvement. Strict social and economic controls may have resulted in a general adherence to such edicts, although wood offences were not unknown. Important woods were fenced, but most remained open, and were made the responsibility of the tenantry. It would be very difficult to determine whether such controls were effective in sustaining the area of woodland, but at least there is evidence that woodland was viewed as a potentially valuable resource (at least in the eyes of the landlord), and attempts were made to conserve the woods, and increase the area by new planting. Thereafter, until the early 18th century, little can be gleaned from the estate records about woodland management on Lochtayside.

When the 2nd Earl succeeded in 1717, the estates were heavily in debt, and probably suffering the effects of a prolonged period of political turmoil. Coincidentally, the quantity of papers relating to woods in the estate records start to increase about this time. A clearer picture emerges of how the Earl attempted to reconcile the needs of woodland management in a pastoral economy. There appears to have been an increase in the number of woods identified as being potentially profitable for the estate, which included not just oak and fir woods (the latter largely planted), but also birch woods. Oakwoods remained the jewel in the crown, and the Earl was keen to see Sir Duncan's dykes, built almost a century earlier, repaired and maintained. As for the other woods, as long as the stock was kept out for a few years after cutting, that would be acceptable and no fencing would be required. Presumably this meant that the Earl expected that there would be no difficulty in keeping stock out of regenerating woods. The only effective means to achieve this would be by using a herd, particularly in winter. Unfortunately there is not way of telling if this control method was effective.

One means employed to ensure the prevention or limitation of grazing in woodland was the granting of abatement. This was essentially an

acknowledgement by the landowner that management of woodland could be carried on only at the expense of stock farming. The Earl and his advisers had therefore to decide whether the loss of revenue from other land uses and particularly wintering, would be compensated for by the revenue gained through woodland management. It was, to an extent a lottery, and the individual interests of the various Earls had as much to do with such decisions, as any attempt at a cost-benefit analysis. Abatements or allowances were consequently granted by the landowner in respect of the loss of pasture, and therefore productivity likely to result from woodland management. If such allowances were not made, a tenant might fall into arrears, resulting in a loss of revenue to the estate anyway.

The first definite evidence for abatements being granted for woodland management on the Perthshire estates, appear in the late 1730s. Thus in 1738 and 1739, an allowance or abatement of £40 Scots was given to the tenants of Auchrioch in Strathfillan, for two years running, for "an inclosure taken off them till the woods grow up" (GD 112/9/5/10). In the same Accounts, an allowance of £13-6-8d. was also given for "keeping up Park of Finlarig". Unfortunately, it is not clear what proportion this was of the total rent.

Further reference to the use of abatement has not been found and, unlike the evidence for abatement on Loch Lomond and Loch Rannoch, there appears to have been few, if any, petitions submitted claiming abatement for loss of grazing due to woodland enclosure (Lindsay 1977a, 29). The economic organisation, as depicted in the 1769 Survey, appears to underline the general lack of enclosure, particularly on the south side of the loch. While accepting that this may not be a true representation of enclosure (see discussion in Chapter Two), particularly of the extent of temporary fencing, nevertheless the general state of enclosure, or the lack of it, would indicate that it was still accepted that woodland management did not require fencing, if stock could be controlled. Moreover, it may be suggested that pasture requirements still largely took precedence over those of woodland management. Consequently, certainly in the first half of the 18th century, a general consensus may well have been achieved between the conflicting aspirations of tenant and landlord.

By the end of the century, however, the balance began to shift in favour of woodland, in the eyes of the landlord at least, as the value of coppice rose very strikingly between 1790 and 1815 (Lindsay 1974, 404). Coppice was then perceived by the landowners to offer the opportunity of a higher income per acre than any other land use, and the extent of woodland enclosure started to become

significant, which must have become particularly difficult for the tenantry to accept.

The 4th Earl was obviously prepared to adopt a policy of woodland enclosure and management, when he took control of the estates in 1782. He was particularly keen to modernise his estates, and could probably impose reorganisation more effectively than previous incumbents, not least because he was likely to have been less tied by old clanship responsibilities and loyalties. The resulting constraints imposed by enclosure on the still-expanding Lochtayside population, must have further increased the pressure on an already stressed economy. One manifestation of this, in relation to woodland, was the increasing number of instances of damage to woodlands, and disputes regarding livestock in woodlands.

The estate records show that from the end of the 18th century, there was an increasing incidence of wood offences relating to the trespassing of stock in enclosed woods. More efficient estate administration may partly account for this increase in paperwork, although it is clear that there was genuine concern at the level of damage being done to woodlands by stock. The various instructions and reports which passed between the Earl and his woodkeepers at this time, provide an indication that the conflict between woodland management and pasture had escalated. Thus in 1799, Carmichael the woodkeeper, reported to the Earl that all the woods on north Lochtayside were pastured with sheep, cattle and horses. Furthermore, all the gates had been left open, and in particular, much damage had been done by sheep to the oakwoods and plantings on the farms of Kiltyrie and Edramucky (GD 112/16/10/5). This level of damage obviously incensed the Earl, who wrote the following year to Carmichael, instructing him to see that the tenants adhere strictly to previous instructions given "to prevent all cattle in future from pasturing in the woods and plantations, except calves during the summer months and they must be removed by the 1st of November (GD 112/16/10/3). It is interesting to note that even with such tight controls, there were still concessions being made to the farmers by allowing calves to pasture the woods in the summer.

By the late 18th and early 19th centuries, illicit cutting was still the most common wood offence. There appears, however, to have been an increase in the incidence of the offence of trespass in woods coming to the local Court, reflecting the concerns expressed by the Earl in the aforementioned instructions. It would be worrying enough to the Earl that his tenantry was prepared to circumvent his regulations, but the following incidents recorded in estate papers, throw a new light on the changing nature of Highland society. In a study of Morenish district, Bil revealed that to prevent destruction of woods of the district, "it was the

custom....to keep sheep above the wood" (Bil 1994, 14). Although no indication is given for which period is being referred to, it does correspond with an early 19th-century woodkeeper's report regarding the Morenish tenantry and their sheep. There was indeed a regulation relating to the district which stipulated that "the sheep was not allowed to pasture below the road" (GD 112/16/10/2). Around 1815, however, the tenants had agreed among themselves to disregard this regulation, and the woodkeeper reported that he had subsequently found sheep in the plantations, which were inflicting damage to both oak and larch, having entered through a broken dyke. There were other instances around this time of farmers voicing their defiance when confronted by an accusing woodkeeper, over their stock being allowed in woodlands, to the extent that one farmer even admitted he was happy to see breaches in the fence around a plantation, because it would allow his sheep access to its grass and give them shelter (GD 112/74/75).Such open defiance must surely have made the Earl wonder if the control that he and his ancestors had exercised for so long over their tenantry was starting to erode.

Whatever the relationship between the tenantry and woodlands on Lochtayside had been in the past, by the beginning of the 19th century, a state of almost total alienation seems to have been reached. The tenantry clearly still relied on woodland produce, but they had gradually seen their winter pastures being reduced by the vast herds of Lowland sheep farmers, the growing demand for land for new plantations, and the withdrawal of access, at least for several years, to existing woodland.

In 1795, a series of offers were made for the lease of Achmore, which until recently had been the farm of Breadalbane's chamberlains and factors, and included a significant area of oak woodland. The negotiations which took place between prospective tenants and the Earl's current factor, further reveal the estrangement of the tenantry from the woods. All of the bidders, including the McLaren of Cambuscurich (some of whom had not long since been ordered to be removed for wood stealing) wanted to be "freed of the extraordinary expense of keeping in repair the fences inclosing the oakwoods lately cutt within the Farm" (GD 112/10/2/2). Furthermore, they all wanted to be allowed to cut hay in the oakwoods, and saw the prohibition of pasturing cattle in them as highly detrimental to the potential productivity of the farm.

This series of papers provides an interesting glimpse of the bartering process, and most certainly substantiates the assertion that, for the local population, pasture was the most important benefit to be gained from the woodlands. Incidentally, the

outcome of this bargaining process was a 21-year lease being issued to David Brown of Dunchroisk in Glenlochay. In it, the Earl conceded to the new tenant the use of a partly-wooded, small park within the oakwood, "as it cannot be wanted, there is no oak in the said park of any consequence". In addition, a rent deduction was to be allowed, "for all the oakwood inclosed, or to be inclosed, in proportion to the inconvenience and damages, done to the said farm till privelidge of pasturing are allowed to the same inclosures" (ibid.).

The custom of being allowed to take hay from a woodland enclosure was obviously important in the negotiations for Achmore in 1795. It was a practice which came to light in the 1769 Survey, and doubtless was a custom at earlier periods as well (McArthur, 1936, 169). This labour-intensive activity which required the use of a sickle, and the removal of the cut grass from the wood in order to dry it, was permitted in wood enclosures in 1769. The potential, or indeed opportunity, for damaging young growth during this process, however, became apparent, and by 1800 orders were given that no grass, ferns or brush was to be cut in any plantation at least, until the trees were at least seven years old (GD 112/16/10/3). Evidence that this practice continued to be a problem for woodland management, is confirmed by the incidence of this activity in the lists of wood transgressors in the opening decades of the 19th century (GD 112/16/10/5).

Another related illegal practice, which appears from time to time in the lists of transgressors and woodkeepers reports, was the grubbing up of trees. There is little direct evidence that this major operation was undertaken to clear ground for cultivation, but it certainly occurred in relation to the improvement of meadows. Thus in 1815, MacGregor reported that he had found 36 ash trees had been cut, on a pendicle near Parknacloich, including 18 roots, which had been hidden. Following the possessor's initial denial of the offence, his son finally confessed, stating in his defence "that they could not labour the ground with so much in the way of theire improvements" (GD 112/16/10/2). This act was obviously, particularly frowned upon by the estate. Furthermore, comparison of the 1769 survey and OS 1861 maps shows that some areas of woodland seems to have disappeared. Although the different approaches to woodland definition may account for some of the changes, the cartographic evidence for loss of woodland, as discussed in Chapter Two, suggests than some woodland margins may have been cleared for cultivation, as well as to improve pasture.

By 1815, no grass was to be cut in any enclosures, and by 1826, "no person whatever is allowed to trespass within the woods and plantations" (GD 112/16/10/3). The complete exclusion of anyone entering woodland enclosures,

as already stated, related as much to the detrimental effects that people might have on woodland game, as to the potential for damage that might be done to young tree growth. As part of their remit, woodkeepers were now required to observe the state of game in wood enclosures, particularly roe deer, and to warn the population of the illegality of hunting game on the estate in general, and in particular in the enclosures under their charge (GD 112/16/10/2).

Game had been increasing in importance on Lochtayside from early in the 19th century. The 4th Earl made it clear in his instructions, as early as 1804, that "the inclosed woods and plantations on Lochtayside should be forests for roebuck and cover for game of all kinds, and therefore no sheep or cattle will be allowed to pasture in them" (GD 112/16/10/3). This seems rather paradoxical, given that roe deer, or any other wild herbivore, are just as likely to be damaging to young trees, as sheep and cattle. In fact, they can be even more destructive because of their habit of rubbing and fraying saplings which can kill young trees.

This desire to encourage game in plantations appears to be an early sign of the development of the Victorian sporting estate. Presumably, this policy reflected the 4th Earl's individual appetite for sport, and was the precursor to the letting of shooting on his estate. This became an established element of estate rental income towards the middle of the century, not only on Lochtayside, but throughout the Highlands (GD 112/74/88). This use of the woodland area is exemplified by the extraordinary numbers of game shot around Taymouth by Prince Albert, when he and the young Queen Victoria visited Taymouth in 1842. Thus in one morning alone, the Prince and the Earl shot 20 roe deer, 4½ brace of black game, 3 brace of grouse, 1 brace of capercaillzie, 1 partridge, 1 wood pigeon, 12 hares, several rabbits, and 1 owl (Buist, 1844, 152; Duncan Millar 1996, 102).

There can be little doubt that grazing has been, and remains, one of the most significant single factors affecting the woodlands of Lochtayside, and beyond, in historic times. What these effects were, has been the subject for considerable discussion (Darling 1949 65, 137; Anderson 1967, 95-101; Lindsay 1974, 132-193; Mather, 1993, 80). Grazing is an inherent element of any woodland ecosystem, but there is a threshold density of grazing animals, over which the regenerative capacity of any particular woodland is affected to the point where recruitment cannot match extinction. Without an in-depth analysis of stocking levels on Lochtayside during the study period, at least when combined with an assessment of current data on the variation in the effects on tree growth of individual herbivores, both domestic and wild, there can be no definitive statement on the effects of this utilisation of woodland area during the period.

From the evidence which has come to light during the current study, it is possible tentatively to suggest a number of conclusions regarding the effects of the non-commercial use of Lochtayside's woodland area, during this period (See below in Summary).

Although not of principal interest for this study, it is worth considering briefly the fate of the upland woodlands in Breadalbane since grazing undoubtedly inhibited regeneration, to the extent that today areas which supported scattered remnants, such as those of the Forest of Mamlorn (the hill ground between the heads of Glen Lyon and Glenlochay), are completely void of woodland, with only occasional birches or rowan hanging on beside rocky burns.

Woodland remnants in these hill areas were likely to have been dominated by birch, and perhaps Scots pine. The latter is very susceptible to fire and does not produce coppice shoots after cutting. It is not surprising therefore that its regenerative ability in the face of grazing animals and human axes would be severely reduced. Birch, in common with Scots pine, is a pioneer species and seeds prolifically, and while it will produce adventitious shoots after cutting, it does not coppice as well as many other deciduous trees, like oak, alder and hazel.

While these characteristics may have affected the ability of upland woodlands to regenerate, it may be suggested that the likely culprits in the demise of the majority of these woods, apart from cutting to meet local sheiling needs, were not the cattle and sheep, which were herded in the summer, but goats, horses and perhaps red deer. The population of the latter, and therefore their impact on upland woodlands in the Highlands, is not well understood for the 18th century, and earlier, but there is a general acceptance that populations of red deer came nowhere near the numbers on the hills today (Smith 1993, 89-97). Certainly no mention is made of red deer in the game section of the Old Statistical Account of Killin parish, although interestingly hares, both brown and white, were regarded as being the most numerous mammal in the parish (OSA *XII*, 475).

On the other hand, both goats and horses seem to have been allowed free range of the hills for a good part of the summer at least. Furthermore, both species can be very damaging, not only to young trees, but also to mature trees. A horse will readily strip mature trees of bark, while goats have even being known to climb a tree to browse. It is said that even in the summer goats in the Cheddar Gorge derived nearly 80% of their diet from trees, shrubs and woody climbers (Bullock, 1995, 155). The goat population declined considerably in the 18th century, as already discussed, and by 1769 there were only 198 animals on the south side of

Loch Tay, which were concentrated on the upland predominantly sheep farms of the Ardeonaig and Ardtalnaig burns (McArthur, 1936, 105-9, 143-51). Horses, while still essential for farming purposes, also began to decline towards the end of the 18th century with the introduction of new Lowland breeds, and a decline in the semi-feral herds formerly kept by the early Campbell Lairds. Of course, as goat and horse populations declined, the hills were beginning to be stocked by large flocks of sheep, and progressively with red deer. It may be suggested that from the late 18th century onwards, the latter species would have had a significant impact on any remaining woodland remnants in the hills above Lochtayside.

The traditional pastoral-based form of agriculture that prevailed on Lochtayside for much of this period was depended upon the availability of the woodland area of lochside, both for the provision of pasture, and to help supplement winter fodder requirements. While external markets for timber and bark remained marginal, restrictions on grazing and other uses of the woodland area, seem to have been limited to those oakwoods which had long been viewed as being of importance to the Glenorchy Campbells. The potential for conflict between woodland management and pasture was therefore kept to a minimum. It is also possible that at the same time, since the woods were also valued by the local population as an important resource to meet their requirements for woodland produce, there may have been some form of rudimentary regulation of grazing in the unenclosed woodland area which was generally adhered too, although this possibility is more difficult to substantiate.

With the increased commercial demand for coppice produce, the potential for conflict escalated, and disruption of one or other, or both land uses was inevitable. This increasingly became the case towards the end of the 18th century, and the Earls of Breadalbane had to make concessions to their tenantry's pasturing needs. A number of measures were employed by the Earls in attempting to reconcile the conflict of interests. These included, the provision of abatements for loss of pasture, abbreviation of the period of stock exclusion from enclosures, and the concentration on woodlands with the greatest potential value for enclosure. Furthermore, stricter controls and regulations regarding access to woodlands, and maintenance of enclosures were formulated, with the continued use of local courts for punishing offenders.

These measures did not, however, always avert confrontation, and there is considerable evidence that the tenantry resented the imposition of woodland management. Without the introduction of such measures, however, it is possible that the woodlands would have been in a much worse condition by 1850. On the

other hand, it could be argued that if the various Earls had adopted even firmer woodland management policies, the decline in the area of semi-natural woodland on Lochtayside, which has been described in Chapter Two, might have been halted or even reversed. The very real and pressing needs of a burgeoning population, who relied for their basic subsistence on pastoral-based agriculture, required compromise. By the time that traditional agriculture was being irrevocably changed, with an associated decline in population, plantation forestry was in the ascendancy on Lochtayside, and the sporting value of woodlands was increasing. A whole new set of factors was therefore influencing the composition and condition of the semi-natural woodlands by the advent of the Victorian era.

Summary

An examination of the non-commercial utilisation of the semi-natural woodlands of Lochtayside was undertaken, based primarily on the Breadalbane muniments. This revealed that there was considerable local demand, both for the produce of these woodlands, and for use of the woodland area. Tenants on the Breadalbane estates were generally allowed to extract woodland produce and use the area as a privilege rather than a right. This utilisation was always regulated by the landowner, principally through the local Baron Court, and aided by specialist estate employees. From early in the 18th century, however, the unconstrained use of woodland produce was curtailed, and payment was required for timber and bark. Illegal cutting in woodlands remained prevalent throughout the period, while offences relating to trespass by livestock seem only to have become significant towards the end of the 18th century. The increase in commercial demand for woodland produce, and associated woodland enclosure, seems to have resulted in the upsurge in the contravention of regulations regarding access to woodlands.

Local demand for woodland produce was considerable throughout the period, since wood-based materials were required for every aspect of rural life, and particularly for house construction and agricultural implements. As the population decreased in the early 19th century, and there was increasing specialisation in trades, demand may have levelled off. At the same time, large timber was being provided free as an incentive to build modern houses, which once built were more durable than their predecessors. Pressure on the semi-natural woodlands was also reduced by the increasing productive potential of extensive plantations created in the 18th century on Lochtayside. Further work on the farm building requirements of this period, and their construction, is needed to enhance the understanding of timber requirements.

At the same time, demand for use of the woodland area does not appear to have declined. The grazing regime required the use of both upland and lowland pasture on a seasonal basis, with the availability of winter pasture being particularly critical. This form of agriculture affected both hill and low lying woodlands. It is probable that the combined effects of the exploitation of timber from hill woods for sheiling use, and the intensity of grazing, particularly by goats and horses, precipitated the near extinction of the already depleted hill woods. This demand for winter pasture conflicted with the requirements of woodland management, particularly when commercial demand for coppice produce increased towards the end of the 18th century. The need for compromise limited the effectiveness of woodland management, resulting in the exclusion of some areas of woodland from systematic management.

Changes in the agricultural economy, in particular associated with the introduction of a new form of sheep farming, while initially only affecting the more upland areas of Breadalbane, increased in significance during the 19th century. This may have intensified the pressure on the lochside woodland area, and in particular in those woodlands which had remained unenclosed. Other enclosed woods, and particularly new plantations, were increasingly utilised for game. These woods escaped further exposure to the detrimental effects of sheep and other livestock, at least until the mid 19th century.

While it is clear that both the non-commercial utilisation of woodland products and area have had significant effects on the condition and extent of the semi-natural woodlands of Lochtayside, the evidence obtained during this study is probably not sufficient to evaluate the relative importance of these interrelated forms of utilisation. A more detailed analysis of the pattern of livestock husbandry prevailing during the period would greatly enhance the understanding of the processes likely to have influenced domestic utilisation of Lochtayside's woodlands. In addition, the application of ecological techniques, including field survey, of present woodland communities, may provide indications of the effects of the different forms of past management.

The Commercial Utilisation and Management of the Woodlands of Lochtayside

There has been a dearth of work undertaken over the last 20 years on the commercial utilisation of the semi-natural woodlands of the Highlands, during the 18th and 19th centuries, when such activity was at its peak. Much of the current

understanding of this subject area is still rooted in the work of Lindsay (Lindsay 1974). Other area-based studies have also shown the extent of commercial utilisation of these woodlands, while work covering other aspects of woodland history have also proved enlightening (Tittensor 1970; Rymer 1980; Cheape 1993; Smout & Watson 1996). Much of this body of work has depended on the availability of documents relating to the use of woodlands by the various estates, and in particular the sale of woodland produce.

The current study has had at its disposal the extensive Breadalbane muniments, from which much information has been gleaned about the domestic uses of woodlands on Lochtayside. As already stated in the previous chapter, there appears, however, to be an absence of some key documents, relating to commercial woodland utilisation, which were expected to be present in the estate records. In particular, these include wood contracts for Lochtayside. The fact that they exist for Breadalbane's Argyll estates, but seldom for the highland Perthshire estate, is particularly puzzling, and might lead to the conclusion that there were therefore no sales of woodlands on Lochtayside to outside commercial interests. This lack of specific information regarding the sale of woods outwith the locality undoubtedly imposes limits on the interpretation of the commercial utilisation of Lochtayside's woods, but it will be argued in the following section that external market forces did influence the management and utilisation of these woods. This will be achieved by describing the evidence that does exist for commercial utilisation during the period, and its relationship to the treatment of the woodlands.

It would appear that the Campbells of Glenorchy, from as early as the 16th century, valued trees and made attempts to conserve their woodlands, principally by enclosure and stock exclusion, but also augmented the resource by planting. Certain woods were obviously prized, particularly oakwoods, yet it is not clear why such efforts were applied, which must have involved not inconsiderable costs in time and money. No direct evidence has been uncovered which might explain why 'black' Duncan (the 7th Laird of Glenorchy) went to such pains to protect some of his woods, and not only around his seat at Finlarig, but elsewhere on Lochtayside. Some of his parks might have been related to deer for hunting, while other woods may have been needed to meet local demand for building castles, ships etc. (e.g. GD 112/9/6). Is it possible that he was anticipating commercial demand for woodland produce? After all it was well known that large amounts of timber had to be imported into Scotland in the 17th century to meet demand, particularly from the building trade, so perhaps a market already existed for Lochtayside timber, (Smout 1960, 3-7). A reference in the Baron

Court Book for 1618 mentions a tenant convicted of sending four loads of "great tymber" to Glen Quoich from "ye wodde of Caleloquhan": so someone presumably made money from this.

'Black' Duncan's attempts at woodland conservation may perhaps also be seen as an investment strategy for his progeny. It is even conceivable that he was aware of Sir George Hay's venture in Wester Ross which used the Letterewe woods to make iron, and saw this use of woodland as a possibility for his estates (Smout & Watson 1996, 994-5). Although the Scottish tanning trade during this period was thought to be fragmented and in an unsatisfactory state, evidence from the Breadalbane muniments that woods near Callander were sold to tanners in the 1620's, would indicate that 'black' Duncan was also aware of the potential for selling oak bark (Lindsay 1974, 393-4; 1975a, 89).

Evidence for further developments in the commercial utilisation of Lochtayside's woods during the remainder of the 17th century was not traced. This is understandable given the political turmoil of this era. The enhancement of Lochtayside's woodlands was, however, continued by Duncan's great grandson, John, the 1st Earl of Breadalbane. Thus in 1709, in a letter to the Earl of Northesk, accompanied by a pound of Scots pine seed, he wrote that the seed was "of the best sort, and the product of firr trees which I did sow in seed since I came to this place" (quoted in Smout 1960, 9). This early promotion of planting underlines the continuing interest shown by the Glenorchy Campbells in trees, and particularly in Scots pine. Indeed, the earliest known commercial woodland ventures related to their pinewood resource, which was probably not as great in extent as their deciduous woodlands.

In 1692, the 1st Earl reached agreement with Richard Frith and Elias Beake which allowed them to "pierce firr trees in his woods for extracting of turpentine out of them (GD 112/16/11/2). Such an operation would not normally kill a tree, and may have been undertaken on a non-commercial basis by the tenantry. In Poland, for example, birch sap is still extracted using the sustainable 'herring bone' method (pers. comm. A Drever). Nonetheless, if over-extraction of sap took place, there was a danger than the tree would die, and part of the agreement made provision for this possibility, and any damage done was expected to be paid for. Part of the agreement also involved the sale of timber for making casks to carry the sap. This would have presumably involved deciduous trees for hoops, as well as fir trees, and yet no provision was made for protecting cut stumps or pine regeneration.

One other requirement, on the part of the Earl, was that he was to guarantee that "no violence or injuries be done to them". He also had to ensure protection for the Irishmen (see below), and it was almost standard in Highland wood contracts of this time to agree to protect the fellers from local attack or resentments, suggesting that such sales were much disliked by local tenants (Smout, pers. comm.). This was after all a society where violence was still endemic; a legacy of inter-clan warfare, which was then still within living memory. It was not safe for 'sassenachs' to venture unattended in the Highlands, a factor which indeed may have limited the development of commercial exploitation in the 17th and early 18th centuries.

It is not known if this agreement was ever fulfilled, however, some 30 years later, the 2nd Earl allowed his firwoods in Glenorchy to be again the subject of a commercial venture (Lindsay 1977b, 56-7; Smout & Watson 1993, 993, 995; GD 112/16/11/2). The 2nd Earl was particularly interested in the development of his woodlands, but unfortunately this sale of both 'fir' and deciduous wood in Glenorchy to two Irishmen must have left him particularly wary of foreign entrepreneurs. Captain Arthur Galbraith from Dublin, and Roger Murphy, a tanner from Enniskillen, entered into a contract with the Earl in 1722 to cut Scots pine in Glenorchy. Although there were safeguards built into the contract, including the exclusion from cutting of any pine tree below 24 inches circumference at 3 feet from the ground, it has been suggested than these safeguards were too vague, and therefore open to abuse (Smout & Watson 1993, 993). Certainly three years into the contract, the Earl became only too aware that the agreement had been too lax. He despaired at the "desolation wreaked by the Irishmen", and lamented that there was "not one oak tree in the countrie for any use, so there will not be once they [are] done one fir tree" (GD 112/16/11/2; quoted from ibid., 994).

It is important to be aware of such experiences as those briefly described above, because they must have influenced, at least indirectly, the policies pursued by the Earl for his other woodlands, including on Lochtayside. It must also be remembered that the burden of debt inherited by the 2nd Earl was considerable, so any decisions taken in relation to commercial ventures on the estates would surely have been taken with this debt burden in mind. Furthermore such decisions, up until the 1730's at least, would have been made jointly by the Commissioners appointed to run the estate after the death of the 1st Earl.

It is not possible to say for sure at what point coppice management was adopted in the Lochtayside woodlands. It is probable that both landlord and tenant had long

practised a rudimentary form of coppice management which simply utilised the tendency of deciduous trees to throw up new shoots after cutting. However, there is not sufficient information to determine exactly when formal coppice management was adopted on Lochtayside; that is, a system of management which involved regular cutting followed by the protection of stools (coppiced tree stumps) to ensure continuity of the trees in the woodland, and therefore that a further crop can be taken after a set interval.

While some woods in lowland Perthshire were known to have been managed as coppice from as early as the 14th century (e.g. Methven Wood), it appears not to have been a common management practice in highland Perthshire woods until the 17th century, and then only around the Highland margin (Lindsay 1974, 342; Lindsay 1975a, 89). It has been established, for example, that some of the Montrose estate woods in Menteith were coppiced at least as early as 1678, and some woods on the eastern side of Loch Lomond were similarly put under coppice management at least after the Buchanan estate was sold to the Montrose family (ibid.; Tittensor 1970, 110).

On Atholl, the development of a coppice management system seems to have been slower. An anonymous proposal of 1708 which set out to advise the Duke of Atholl on a wide variety of subjects regarding his estates, included the suggestion that the woods of Atholl could be very profitable "if their were regular and thrifty methods taken in selling the timber and bark" (Leneman 1986, 186). Furthermore, the author of the proposals suggested that the woods should be enclosed after cutting. This would suggest that Atholl had yet to adopt regular and sustainable coppice management. By the 1720s, however, estate papers reveal that commercial use of the woods was being made, though what form this utilisation took was not indicated (ibid., 186-7).

In his work on the use of woodland in Argyllshire and Perthshire between 1650 and 1850, Lindsay explored the pattern of regional variations in coppice management in these counties. He concluded that there was a tendency for regional differentiation, especially after 1800, with four principal coppice-producing areas emerging, each with its own mode of produce marketing, which in turn influenced the form of management of the coppice (Lindsay 1974, 460). These were: Argyll, which had an external market for bark and internal commercial demand for coppice timber in the form of charcoal for the iron works; Dunbartonshire and west Stirlingshire, which were accessible to the Glasgow timber and bark markets, including charcoal material for industrial processing, and

probably were the most profitable coppice districts after the late 18th century; south west Perthshire and west Stirlingshire, where Stirling and the lower Forth markets offered comparable prices to Glasgow, but where access was a more limiting factor for the coppice areas, and small local tanneries were important; and finally the eastern part of the Highland margin of Perthshire, including Lochtayside, where the Perth and Dundee markets were less lucrative, and there was a greater dependency on the sale of bark for profitability, with domestic uses of woodland produce being more important (ibid., 460-62).

Although Lindsay was only able to examine this issue in broad terms, it is considered a useful subject area for discussion in relation to Lochtayside, particularly because his research tended to concentrate on south west Perthshire, Stirlingshire and Argyll, and did not involve detailed examination of the coppice management of north west Perthshire. The question must therefore be asked; how much did Lochtayside fit into Lindsay's scheme of regional differentiation of coppice-producing areas? Furthermore, how much did the lack of advantage assumed to have been operating in this district, affect the form of management adopted on Lochtayside?

Of course this suspected regional differentiation only became particularly evident after 1800, and seems to have depended on the development of timber markets rather than those for bark. Nevertheless from the above description of the location of the earliest examples of coppice management in the Highlands, market advantages appear to have been shaping this regional pattern from very early on. Those areas, perhaps with the exception of north Argyll, which became the most established areas for coppice after 1800, were therefore able to profit from their locational advantage in relation to markets, as early as the late 17th century.

It would appear that the chronology for the development of the commercial utilisation of woodland based on coppice on Lochtayside was closest to that of Atholl. The 2nd Earl of Breadalbane was obviously aware of developments on neighbouring estates, and he himself had begun to develop his Argyll woods in the 1720s, presumably in response to market demand for the produce. It is possible that on his Perthshire estate a number of factors were preventing him from being able to take advantage of the developing demand for coppice produce.

Lochtayside was primarily disadvantaged by its geographical location. Unlike Argyll, it had no access to coastal waters, and therefore to the main markets on the Clyde. It was also somewhat more distant from Perth and Dundee than most of the Atholl woods, and use of river transport was limited by rocks and rapids on the

upper Tay. In addition, overland transport was difficult, and Lochtayside missed out by being several miles off the routes of the two main military roads built by General Wade in the 1730's. Crieff was the nearest market town, and location for important cattle trysts in the early 18th century, but involved travel across the hills between Loch Tay and Strathearn. On the other hand, Perth may well have been a more suitable market, particularly for the east end of the loch, and access only required following the river downstream. Even then, Perth was some 38 miles from Kenmore. The nature of the demand for coppice produce would have been critical in this equation for overland transportation of timber must have been much more costly than for bark. This relative remoteness must therefore have significantly increased transportation costs, and may have encouraged sale of produce, particularly timber, to small local merchants.

Evidence is available to support the assumption that the earliest commercial trade of woodland produce was with local merchants, who may also have been in some cases tenants or tacksmen. Thus in 1723, at the roup (auction) of a birchwood in Glenlochay, the purchasers were "Coline Campbell of Lochlan, John McNab of Auchewen, Patrick Campbell of Edinchip, Coline Campbell for Milnmore, John Carmichael at the Bridgend of Lochay and Hew Campbell at Killin" (GD 112/15/186). Three of these co-purchasers were from the Killin area, while the other three came from Strathearn, and are likely to have been gentlemen. In fact, the purchasers named in the only other wood contract uncovered for the sale of Lochtayside's woods, in 1787, also involved Strathearn men (GD 112/11/2).

Very little information can be gleaned from the papers relating to the sale of the Glenlochay birchwood, and it is not known the use to which the produce was put. It is possible that these men would sell on the wood produce, both bark and timber, to tenants, but equally, they may have been selling to outside interests. A memorial written by the 2nd Earl in the same year is, however, more specific regarding the sale of his woods. He refers to the cutting of a birchwood at Craig in Glenlochay for cabbers, and emphasised that it should be fenced, and "if you cut it by hags you must put a cross fence this year for thatt had, and so on yearlie" (GD 112/11/1). If, as seems likely, he was referring to the same birchwood as above mentioned, it must be assumed that the Earl was well aware of the necessity of fencing following cutting, and this form of management may well have been practised in other woods in the district. Interestingly, if cabbers were the principal produce from this birchwood, it would suggest that the Earl was using middlemen to sell to the local population. There is no indication that bark was the main product from this sale, although it was likely to have been part of the bargain. Again, it may have been sold locally, rather than exported.

The same memorial also underlines the links with Crieff, for much of the paper was taken up with the sale of 'fir' timber from Finlarig to Crieff merchants. In the memorial the Earl orders his chamberlain to "send for a Creefman and let him see the timber growing". The Earl had estimated that there were around 3,000 trees in one of the Finlarig enclosures, which would fetch two merks a tree in situ, but three merks if carried to Crieff, "which I reckon may be properst not to loose a merk a tree for cariadge, especially the tennents being free of my cariadges". Incidentally, later in the memorial, reference is made to June and the beginning of July being the time for "tennents service", which the Earl foresaw as being utilisable to transport fir timber from Edramucky, on north Lochtayside, to Crieff.

The use of carriage duty has been suggested as an important consideration in the cost effectiveness of bark sales, although this was rarely extended to included transportation of timber (Lindsay 1974, 411). By the early 18th century, many aspects of the feudal relationship between landlord and tenant had been abandoned. It would appear from this document that the obligation to carry wood for the landlord had ceased on Lochtayside. The continuation of other 'services' may refer to a slightly different labour dues, which when called upon, could be utilised to transport timber. It was more usual for these services involve carrying peats and later coal for the laird, and perhaps also the obligations to provide labour on the laird's home farm (Dodgshon 1981, 249). Few other references were found which mentioned carriages or services, and it may be possible that on Lochtayside at least, wood carriages were not normally used to offset transportation costs.

The difficulty of transporting wood produce, particularly large timber, out of the district, was acknowledged by the 2nd Earl. In discussing the 'fir dealls' to be cut and sawn at Edramuckie in the above-mentioned memorial, he declared that they "will be too big to draw to Creef except they be sawed in two". It is quite probable that these pine trees were the product of the enlightened plantings of 'black' Duncan some 100 years earlier, for in the same memorial he ordered the cutting of several hundred plane trees which were "Sir Duncan's old ones" planted about the fir enclosures. Despite this early trade in timber, and the not insignificant number of pine and oak clumps planted from the 17th century onwards, Lochtayside seems to have been an importer, rather than an exporter of pine timber, including from Rannoch (Lindsay 1974, 303). It is likely that many of these pine and oak clumps were planted for ornamental reasons, although the Earls were well aware of the possibility of them being profitable as well GD 112/15/112).

Reference was briefly made in this document to the use of the oak about to be cut from the same enclosure as the pine. Although it is not clear whether the oak and pine were of a similar age, the fact that the Earl expected to get as much for the oak bark as for the pine trees, would suggest that the oaks were younger, since it was generally accepted that bark quality decreased after a certain age; the ideal cutting time being 24 years (Lindsay 1974, 353). The oak timber, on the other hand, was earmarked for local use around Finlarig, which suggests it could not have been exportable, presumably because market demand and transportation costs combined to make this unprofitable. That the commercial markets were unfavourable is underlined by the Earl's decision not to cut most of the oak "till proper uses be got for them". Nevertheless he obviously envisaged the development of favourable market demand for the produce of the Breadalbane oakwoods, and was prepared to take care of them, in order to reap the benefits at some later period.

The extent of his knowledge regarding his woods, and his faith in their eventual value, is recorded in a letter he wrote in 1723 to Robert Campbell, his newly appointed wood overseer, in which he stated that he knew "every wood and know[e] and the woods are and will be valuable in time if you do now look to it to keep them" (GD 112/16/10/1). In this letter, he listed 30 woodland areas in Breadalbane (including Lochtayside, Glenlochay, Glendochart, Strathfillan and Glenfalloch), which he described in terms of composition and current management, and proposed how they should be treated in the future. Much can be learned about the Breadalbane woods from this document. It is clear, for example, that although most of the woods had been subjected to a form of coppice management, their remained some woods containing old trees, including at Achmore, and Tullich in Ardtalnaig; the latter about to be cut.

A number of oakwoods were said to have been lately cut, but obviously had not yet been fenced, for the Earl was ordering this to be attended to. There was also a surprising number of existing fences or dykes, the latter presumably the legacy of 'black' Duncan's handiwork, but other fences had clearly been more recently erected following felling.

Reference to previous purchasers was only made for Craig Wood in Glenlochay. Thus the Earl suggested that the "young birks of that wood may be sold by dozens for folding to tenants as some were sold two years ago". Regarding the destination and purpose of the oakwoods, little information can be gleaned, except that many of them seem to have been badly cared for, and poorly cut by the tenants in the past. It seems probably that, like the aforementioned anonymous

present of proposals for Atholl in 1708 (see above), the Earl was anticipating future profitability for his woods, rather than actually gaining very much at the time of writing (Leneman 1986, 186). The Earl may well have been aware of the developments in coppice production elsewhere in Scotland, and that domestic oak bark prices had been rising since the turn of the century, so although his decision to concentrate more on his deciduous woods was speculative, it was nevertheless based on the expectation of future economic returns.

Lindsay has asserted that formal woodland management was rare in the absence of commercial demand, and when profitable owners took more care to conserve their woods (Lindsay 1974, 89). In general, this was probably true of the Earls of Breadalbane, although at least two mitigating factors should be considered in relation to this assertion. Firstly, it must be expected that silvicultural 'know-how' particularly by today's standards, was probably not very advanced in the 18th-century Highlands. If traditional management of Highland woodlands had centred on withdrawing stock during the initial critical stages of regeneration, rather than on costly and time-consuming fencing operations, then the Earl's adoption of exclosure by fencing should be seen as the work of an enlightened landowner, who was assimilating new ideas of woodland management based on lowland practices. If such an assumption is accepted, the 2nd Earl of Breadalbane should neither be judged by today's silvicultural standards, nor by contemporary Lowland standard of management. That is not to deny, however, that the profit motive was insignificant in the decision-making process, or that management was not a selective process with some woods being excluded from careful supervision. The 1769 Survey certainly provides evidence for the exclusion of some areas from commercial utilisation and formal management, the reasons for which have already been discussed in this chapter.

Secondly, it is worth considering that at that time the sale of coppice produce to external markets was not significant. Indeed the evidence suggests that it was from the sale of pine timber that economic returns were being realised. The decision to step-up management was therefore highly speculative. A number of factors are therefore likely to have motivated this decision. Perhaps the 2nd Earl was simply interested in his woods, just as one of his successors was interested in geology and mineral exploitation. It is also worth considering the development of the charcoal blast furnaces in the Highlands in the early 18th century, including one near Loch Achray, near Aberfoyle, in 1718. While Lochtayside was too distant from this furnace to be one of its suppliers of charcoal, it may nevertheless have stimulated his interest. It is also possible that the two Irish entrepreneurs, Galbraith and Murphy, were already making preliminary soundings in 1721,

regarding the sale of the Glenorchy woods, and the iron works at Glenfinglas in Argyll was in fact founded the following year (Lindsay 1977b, 55-7). The decision-making process was therefore a complicated one, with a number of influences affecting the final outcome.

Information about the commercial utilisation of Lochtayside's woods during the next 30 years is very sparse. Why this should be is a mystery. The 2nd Earl continued as the principal decision-maker until 1740, when at the fine old age of 78, he devolved control of the estates to his son, Lord Glenorchy. Of the few papers in the Breadalbane muniments relating to woods on Lochtayside during this time, none relate to the coppice. On the contrary, most of the information relates to timber, local sawmill operations, and what must be some of the earliest records relating to the establishment of pine plantations on Drummond Hill (GD 112/15/462).

While it has been established that prices for domestic oak bark doubled between the end of the 17th century and 1735, this rate of increase was not sustained, and price levels remained low between 1735 and the 1790s (Lindsay 1974, 404-5). It may therefore be surmised that since the anticipated upturn in bark prices did not materialise after 1735, and the newly-established iron works at Aberfoyle and at Glenfinglas ceased operation around 1724 and 1738 respectively, interest in the coppice woods of Lochtayside temporarily waned.

Of course, the possibility cannot be completely discounted that the Lochtayside woods were sold for bark to merchants, local or otherwise, during this period. The lack of evidence does, however, tend to suggest this was a fairly uneventful period in terms of commercial woodland utilisation on Lochtayside. Information relating to the Argyll coppice woods, on the other hand, is much more extensive in the Breadalbane muniments for this period, which would suggest that the 2nd Earl and his son concentrated on their more profitable woods in Argyll (GD 112/16/10/2). Argyll clearly had an intrinsic advantage with its access to coastal shipping, thus enabling transportation costs to offset the relatively low and fluctuating bark prices. There was also, for part of this period at least, a demand for charcoal from the Glenfinglas blast furnace, and the later-established (1752) Lorne furnace at Bonawe (Lindsay 1977b, 62).

The first definite evidence for the commercial use of Lochtayside's semi-natural woodlands was an estimate in 1758 by John Cameron, a merchant from Dunkeld, for the quantity of oak bark in the woods of Breadalbane (GD 15/353). In total, there was an estimated 5,150 bolls of bark (1 boll = 6-10 stones 'Dutch' weight, a

'Dutch' stone = 17.5 lbs. (avoirdupois), i.e. 7.9kg - from Lindsay 1974, 400), from eight areas of woodland between Crannich and Finlarig, and Achmore to Slochd Dow (Cambuscurich). Presumably these bark sources were those which had been enclosed in the past, although Slochd Dow is not depicted as being enclosed on the 1769 Survey, yet its estimated bark yield was 540 bolls. The Wood of Crannich, which may have included more than one enclosed area, was thought likely to yield the most, at 1,200 bolls.

No contract or agreement to confirm that these woods were actually sold was found, however, a number of papers from the following year, suggest that at least some of these woods were cut (GD 112/361). These include an account for building and repairing dykes around oakwoods cut in Carwhin in the summer of 1759, and an account for peeling and cutting timber in the same year on Lochtayside.

It has been suggested that in Perthshire, trade in coppice produce was a supplementary, and rather speculative activity entered into by local merchants and tenants. For this reason the failure to complete contracts was not uncommon, which resulted in proprietors often requiring cash deposits as security, or higher annual instalments in the first few years (of a contract) (Lindsay 1974, 438). It is possible therefore that John Cameron, the Dunkeld merchant, was the purchaser, although later in the century, several estimates were sought from merchants, and wood surveyors did not appear to also be purchasers (GD 112/16/11/5).

It is certainly possible that the bark was destined for Dunkeld, as this small market town, which was at least closer to Lochtayside than Perth, began to develop as a small centre for the tanning industry, so much so, that by 1778 the town had three tanners (Lindsay 1974, 398). At the height of demand for oak bark between 1790 and 1815, the Earl of Breadalbane probably had little difficulty in selling his woods to Dunkeld merchants, and in fact he employed more than once James Inches, a Dunkeld wood surveyor, to estimate the value of the Lochtayside oakwoods (GD 112/16/10/2; 74/228). Dunkeld, however, was some 38 miles from the west end of Loch Tay, while the Duke of Atholl's woods were practically on Dunkeld's doorstep. This locational advantage of the Atholl woods might have been further enhanced by the influence of the Duke over the merchants and tanners of Dunkeld, who may well have been his tenants. Furthermore, in the late-18th century, after supplying the tanners in Dunkeld, bark from the parish of Dunkeld and Dowally was sold to Perth, Forfar and Dundee (OSA *XII*, 383). Dunkeld tanners may therefore have only looked to Lochtayside, when the Atholl

estates asked too much for their bark, or when it was unobtainable for other reasons.

By the same token, Lord Breadalbane may have found a better market for his oak bark in Crieff, which from the west end of Loch Tay was a distance of around 25 miles. The tanning industry was also developing there, and by the 1780s, two tanneries had been established (ibid., 289). Indeed, by the 1840's, there were three tanneries which together reportedly "produced more leather than any similar manufactory in the county", and there were weekly carriers running to Killin and Aberfeldy (NSA *X*, 514-6). In 1787, with the sale of the Breadalbane woods to three Strathearn men, the destination of the bark may well have been a Crieff tannery, although there is no evidence that this was the case, and Perth, where a tannery was established in 1731, Dundee, or even Stirling, may have been the destination for the bark (Vasey 1987, 33).

The fragmentary nature of the evidence for commercial utilisation of Lochtayside's woods during the middle decades of the 18th century throws up many more questions than answers, therefore necessitating a certain amount of speculation. Without more detail about the sale of the woods in 1759, confirmation regarding the period of cutting envisaged for the woods, and the treatment of stumps, or of barren timber in the woods, is unobtainable. It is difficult to establish therefore, whether the survey and cutting of oak woodland on the north side of Loch Tay during 1765 and 1766 was a part of the same rotation, or whether during the seven years which had elapsed since John Cameron's bark assessment, yearly cutting had taken place (GD 112/15/392, 388). No evidence was found to support this possibility. An alternative scenario might be that the sale of an area of oak was dependant upon opportunity, and whether the wood was of a suitable age for cutting. It is also possible that as more woodland was taken into a regular system of management, the age variation would initially be marked. The more established the coppice regime became, the more the age variation allowed for regular, if possible yearly cutting.

Interestingly, a large proportion of the oakwoods between Finlarig and Carwhin were described by Farquharson in 1769 as young, and in one case more precisely as being five years old (McArthur 1936, 13-28). This corroborates previously-cited evidence that cutting was taking place on north Lochtayside during the mid 1760s, but for those woods which Farquharson gave no indication of their age, it may only be assumed that they had already been cut in the late 1750's, and were then slightly older. He did not, for example, describe any of the woods of

Crannich as being young, but given that they were highly valued woods, they must have been among those cut during this period.

Among the papers relating to woodland activities on Lochtayside during the 1760s, two snippets of information merit attention. In the first place, the enclosures built around woods following cutting in 1766 were referred to as dykes. While this does not necessarily indicate construction using stone, nonetheless this was probably the main constituent of such principal dykes (Marshall 1794, 28). Secondly, the employment of a man for three days work, marking oak timber "for the Earl's use in Deshoir wood" (i.e. north Lochtayside from Lawers to Finlarig), in the summer of 1765, suggests the presence of reserves of standards in the woods, that is oak trees set aside to grow on over two or three cuttings in a coppice rotation. It is not clear whether the "Earl's use" of the marked trees referred to use for estate requirements, or implied they were at his disposal to sell to other merchants. Certainly, with all the bridge building and other construction activities on the estate at this time, there would have been a not-insubstantial local demand for such timber.

In 1782, the Breadalbane estates passed to John Campbell of Carwhin, the 4th Earl of Breadalbane. From then on, significantly more documents exist relating to the Lochtayside woods, as well as to other estate matters (see Chapter Two for a discussion of why this should be). Despite this plethora of papers, only one wood contract for Lochtayside was discovered among the Breadalbane muniments. It referred to the sale, in 1787, by roup, of woods on the lochside, from Lawers to Finlarig, and Achmore to Ardtalnaig, for an eight-year period. The purchasers were, as already stated, three Strathearn men, and they paid £2000, in eight yearly instalments, over the period of cutting at £250/year. As it is not known what acreage this included, comparison with similar sales on other estates is not currently possible, although it might be feasible to estimate the area from the enumeration of oak reserves carried out prior to the sale (GD 112/16/11/2).

A much clearer picture emerges from this contract of the standards of care expected during the period of cutting. These included the following restrictions which were to be adhered to by the wood cutters. Thus, cutting which was to commence in May of 1788, would stop by 20th July each year, and the wood was to be removed by the 1st of March the following year. Regarding cutting, this was to be done "as is usual in such cases", which seems rather vague, but it was further required that "if any large trees shall be cut with cross-saw that they shall clean the stool afterwards with an axe". There was no stipulation about how low the stool should be cut, or the treatment of the bark remaining on the stool, but the

latter at least did seem to be open for discussion among silviculturalists (Lindsay 1974, 357-8).

Both large and small reserves (trees excluded from cutting) had already been marked, amounting in total to some 1,520 trees. The cutters were also required to leave enough peeled oak to fence the woods "the principal parts being intended to be inclosed with 'feall' or stone for which pealing (branches for making wattled fences) of 2' or 18" to be reserved [and they were] to leave as much pieled oak as will be necessary for making yearly divisions betwixt the haggs". These regulations generally show the 4th Earl in a good light, although they may not quite have met the approval of later forestry writers such as Robert Monteath. It is even possible that these relatively high standards were influenced by his experiences with the Lorne Furnace Company in Argyll, since they seem to have set the standard for coppice management, at least in the woods they leased and managed themselves (Lindsay 1975b, 298). Lowland wood contracts before 1750 contained all these details, except the one about the cross-saw, and the Earl may have been aware of this (Smout pers. comm.).

If the Earl was rather lax with regard to the actual cutting of the coppice, the detail on the provision of materials for enclosure suggest that he was well aware that the quality of protection after cutting was one of the most important factors in the survival of coppice. The other key to survival was the continued prevention of grazing during the early stages of regrowth. This would tend not to be covered in a contract of sale, since it was usually the responsibility of the owner, and not the purchaser, to arrange for enclosure of the cut coppice. On Lochtayside at least, this seems to have taken place, as shown by accounts for dyke building on the north side farms of Tombreck and Blaremore in 1789, which entailed building or repairing four feet high stone dykes, covered with "2 copes of faile and stake and rice on top" (GD 112/15/401). By 1795, it appears that the time allotted for preserving new growth, including newly planted trees, by excluding cattle was seven years (GD 112/10/2/2). This seems a reasonable period of exclosure by the standards of the day, although writing in the early 19th century, Robertson declared that unless the ground was rich, young shoots (of five-six years) were "neither high enough to be out of cattle's reach nor strong enough to resist their weight" (Robertson 1813, 266-7). So although the 4th Earl seemed to err on the side of caution regarding period of exclosure, the problem of ensuring that the tenantry kept their animals out had still to be overcome: as was seen in the previous section, this was easier said than done.

Despite the lack of solid evidence, there seems little doubt that a more rigorous system of coppice management was practised on Lochtayside from the 1780s until the mid 19th century. Several documents, some of them mere scraps of paper, were found, which set out the coppice regime for all the Breadalbane estate woods, and the income for some of the cuttings (GD 112/-16/10/2; 16/11/5; 15/438; 10/10/2). From these papers, which were written between 1787 and 1815, it would appear that none of the woods in Netherlorn, Glenorchy or Breadalbane were under a full rotation, that is divided into yearly hags, and cut over a full period of a rotation, which in the early 19th century, was indicated to be, for the Breadalbane woods, 25 years. Cutting was restricted to a four-eight year period, presumably depending on size of woodland area. Thus, cutting would begin in Breadalbane in 1787, be completed by 1794, and would begin again in 1812. The woods of Netherlorn were to be cut over five years, while those of Glenorchy would be over four years. The woods let to the Lorne Furnace Company were dealt with separately, and may have be cut for a full rotation of, in this case, 24 years as only the date of first cuttings was given in these documents (Lindsay 1975b, 290).

How strictly these cutting periods were adhered to is not entirely clear, but allowing for some small discrepancies, the various papers generally tally with each other. One paper provides a further breakdown of the cutting periods for the entire Breadalbane woodland resource between 1801 and 1824. This rotation included the woods around Aberfeldy, and even some in Glenlyon. The woods of Finlarig, Fearnan and Inshewan were separately identified, the first two to be cut over one year, and the latter, a large wood in Glendochart, was to be cut over three years. The woods of Lochtayside having been cut over eight years, would be cut again in 1811, this time over a ten year period; possibly suggest an increase in the area under coppice management. All of the above suggests that each year an area of woodland was being cut until 1814, thereafter there seemed to be a break until 1824 when the Lorne Furnace Company woods were ready for the next cutting (GD 112/16/11/5). This arrangement, whereby all the Argyll and Perthshire woods were under one coppice rotation would therefore allow, at least for 14 years, a yearly income from the coppice woods.

Evidence to confirm that the above-cited papers were more than just projections can be found among the estate accounts relating to woodland enclosure. Thus, woods along both sides of Loch Tay were cut in 1792, and in 1794 the woods around Achmore were cut, after which the fences around the woods were repaired (GD 112/-14/6/7; 10/2/2).

It is not entirely clear what the oak timber from these cuttings was being used for, but some of it may have been sold to meet local demand. Of the bark, it can be said, with more confidence, that most of it would be sold to commercial tanneries outwith the area. A letter written to William Stewart of Ardvorlich, the Breadalbane factor for a brief period around 1790, from the estate solicitor in Perth, referred to the sale of bark to a Mr Richardson. In it the poor quality of some of the bark was mentioned, which had led Richardson to offer "10½d. for what was good of it and half price for the insufficient parts" (GD 112/16/11/3). It is not known exactly who Mr Richardson was, where he was based or if it was definitely Lochtayside bark being referred to, but since the Perth solicitor had visited Richardson personally, it can be assumed that he was a Perth merchant. There was around this time a Perth 'fish' merchant named Richardson, who had made a big name for himself selling fish on ice (mainly salmon) to London (Smout pers. com.). It is likely that his business required significant quantities of barrels, and it is not impossible that he had also diversified into dealing in other timber produce. What is perhaps more interesting about this correspondence is that the Earl's solicitor should be dealing directly with this merchant regarding the sale of the bark of these woods, and not the buyers cited in the 1787 wood contract. It may be that the contract had not been completed, and the Earl had to find another buyer for his bark. In that case, he may well have missed out the middlemen, preferring to sell directly to a bark merchant, and carrying out the cutting and winning of the bark using his own labour resources.

Bark was clearly the most important commodity available from these oakwoods during this period, with sales providing a good economic return. In 1819, James Inches made an inventory and estimate of the oakwoods on Lochtayside and the surrounding district (GD 112/16/10/2). To take one example of his calculations, the Cualdochart Park on Achmore was expected to yield 14,500 stones of bark, which at two shillings per stone would amount to £1,450. Following a deduction for the expense of cutting, peeling and winning the bark, the net worth was estimated to be £1,150, "supposing the bark be carried to Perth, Crieff or Stirling". In comparison, the returns from the peeled timber was considerably less, at £150. This was not enough even to offset the cost of bark production, although there appears to have been a developing demand for spokewood, which was excluded from this estimate.

Some 20 years later, bark remained the main source of income from the coppice woods, when a series of estimates for the oak coppice of Carwhin, Kiltyrie and Edramucky provided a breakdown of coppice produce values including the sale of spokewood (GD 11216/11/5). These estimates demonstrate the continuing value

of bark in relation to coppice timber, and although varying slightly, generally suggest that oak bark was expected to make £7-10 per ton which resulted in a profit of about £500 on these woods, while spokewood was expected to make £5-6 per 1,000 spokes. With only a capacity of 2,000-3,000 spokes, more money was expected to be made from the sale of firewood and other measurable timber from the coppices. Even with a deduction for labour and carriage, bark realised consistently more income than coppice timber.

This minimal return for coppice timber may explain why, in 1800 the 4th Earl suggested that "the tenants who want timber to take it for the barking, the small wood may be given to the country people in general for barking" (GD 112/74/727). It is not clear whether this method of obtaining bark was ever adopted, but by 1813, people were being paid for cutting and peeling bark on Lochtayside (GD 112/74/431). It is possible that the development of a market for spokewood, however insignificant in comparison to bark values, was still greater than the expense of employing both estate workers and the local population in bark manufacturing.

By the early 19th century, a shift in emphasis could be detected with regard to the woodlands of Lochtayside. While the coppice woods of the western sector of Lochtayside continued to be an important source of revenue for the estate, the by-now-extensive plantations on Drummond Hill and around Taymouth, were assuming much greater significance than the natural woods of this district, which in any case had tended to be utilised on a non-commercial basis. The investment made over the years based on a policy of planting, both on a large and on a small scale, finally began to pay dividends in the 19th century. To begin with thinnings from the plantations provided a significant proportion of the timber needs of the tenantry, which must have eased the pressure on the natural woods from illicit felling, not to mention the income which was created by these management operations. A document summarising wood sales in Breadalbane and Glenorchy illustrates the increasing sales of the Breadalbane woods, which between 1838 and 1840 rose from £31 to £1,317 and £3,828, respectively. During the same period Glenorchy wood sales were £2, £327 and £1 respectively (GD 112/16/11/5).

It is probable that the sale of woods from Lochtayside in 1840, were sourced almost entirely from plantations. Large timber was at last becoming profitable, but this demand was largely requiring softwoods, not coppice timber. Evidence from several documents confirm that larch timber in particular was in great demand, both for railway sleepers, and in one instance it was also sold, along with ash timber, to a ship builders in Perth (ibid.).

Lindsay described in detail the development of markets for coppice timber, and emphasised the role of spokewood to the point where Lindsay asserted that it "raised the value of timber above the level necessary to cover the cost of preparation and carriage of bark" (Lindsay 1974, 409-34; 421). While the previously mentioned valuations of the coppice on Lochtayside in 1844 suggest that the carriage and labour expenses were not offset by spokewood and other timber sales, such a market did at least add to the commercial value of the coppices. Again, locational disadvantage may have played a role in the poor returns obtainable from coppice timber.

There is, however, one other possible explanation for this apparent contradiction with Lindsay's conclusions regarding spokewood. From the mid 18th century, many of Breadalbane's Argyll woods were producing charcoal for the Lorne Furnace Company's iron works at Bonawe. Charcoal must have seemed to the successive Earls a potentially lucrative product of their woods, especially for those districts where the locational disadvantage reduced opportunities for the sale of coppice timber to external markets. The first indication that the production of charcoal was being considered for Lochtayside was in the late 1780s a paper containing a brief note suggesting that the woods of Achmore and Cloichran "may yield 450 baggs of coal" (GD 112/16/10/2). There is no indication of the author, but it mentioned that this estimate resulted from a request from a Captain Campbell, probably a Breadalbane agent. The script is similar to that of the author of the previous document in the bundle, the author being Andrew McLelland who in 1786 was a woodkeeper in Breadalbane.

A possible use for charcoal in the district at that time would have been at the Earl's lead mines at Clifton near Tyndrum. The mines had been established in 1739 by the 2nd Earl, and had continued to operate until 1798. While it is possible that the ore was transported to the head of Loch Lomond, where it was smelted using the abundant woodland resource of that district, before being shipped down the loch to Balloch, it is known that between 1785 and 1786, 889 bars of lead were smelted at Dalrigh, near Tyndrum. No other information has come to light which could establish the fuel source for the smelting of lead ore at Tyndrum, but the woods of Strathfillan and Glendochart, being closer to the mines, would likely have been the main source of charcoal, although peat might also have been utilised.

During the 1820s, charcoal was definitely being produced on Lochtayside. A series of woodkeepers' reports referring to the various duties of his labourers,

included work relating to charcoal production. These include, cutting and carrying wood for charcoal production, and collecting a man from Dunkeld who was to burn charcoal, in 1822; and making charcoal at Taymouth for two weeks in September 1828, which resulted in 37 barrels of charcoal being produced (GD 112-/16/6/2; 16/5/3). Although it cannot be ascertained if the man brought from Dunkeld was to remain on the estate permanently, there is no doubt that the charcoal burner brought from Argyll in 1825 was to become a permanent resident, for he was given the underkeeper's house in the Brae of Taymouth "with a cow" (ibid.).

Clearly the production of charcoal was being taken seriously in the 1820s, but to what use it was being put is far from evident. By the 1820s the lead mines were no longer operating, although the 5th Earl did re-open them in 1838. The possibility of Lochtayside charcoal supplying any industrial activity on the Perthshire estate at this time must therefore be discounted. It is also improbable, though not impossible that the charcoal was being exported out of the district. There are a number of possible domestic uses for the charcoal, including as a fuel supply for the castle, the estate dairy at Taymouth, or even the greenhouses. Coaling normally took place in the wood, and the charcoal was then transported to the source of demand (Lindsay 1974, 634-6). Specific reference made to the production of charcoal taking place at Taymouth would tend to suggest that the timber supply was therefore not far from there, despite the fact that most of the coppice woods were further west on the lochside, with the exception of Drummond Hill, where oak woodland remained among the conifer plantations. It may be suggested therefore that, during the 1820s at least, this was a small-scale operation, which was carried out close to the source of demand, i.e. Taymouth castle, and was not being undertaken on a commercial basis. Later evidence to support this assumption, is provided by an offer in 1850, to set up a pyroliginous works at Finlarig (GD 112/74/88). It included a proposal that the company undertake to supply the castle with charcoal at a rate lower than it cost to make it.

By the 1850's the natural woods of Lochtayside were being eclipsed by plantation forestry, largely based on softwood production. Thus in 1861 a paper relating to the disposal of wood "in rough", larch was the principal item for sale, often being sold to the local sawmills (GD 112/16/10/3). Other trees included in the sale were spruce, beech, elm and ash, while birch and hazel was being sold by the cartload as fuelwood. This use of 'barren' timber would have been accepted only for the very worst trees at the height of the demand for coppice produce between 1790 and 1815, for even these trees of relatively inferior value to the Earl, would

have been considered only suitable for burning if no other use could be made of them.

The 5th Earl appears to have embraced any venture which might realise some profit, or rather his Breadalbane factor, James Wyllie did, since the Earl does not seem to have been as involved as his predecessors in estate affairs. This seems to have included a willingness to continue to utilise the coppices of Lochtayside at a time when bark prices had declined. This is borne out by a letter from Messrs. Turnbull & Co. to Wyllie in 1850 which refers to the possibility of setting up a pyroliginous works on Lochtayside (GD 112/74/88). This industrial process involved the distillation of wood, primarily to produce acetic acid for use in the textile and printing industries, and resulted in the production of charcoal and tar as by-products (Hunt 1860, 9, 697; Lindsay 1974, 431). Pyroliginous works had by 1845 been set up in Perth, and at Balmaha, the latter utilising the extensive oakwoods of Loch Lomond (ibid., 431; Tittensor 1970, 114).

The 5th Earl must have been aware of the possibilities of utilising his coppice woods for this purpose, although it is not known who made the initial advances in relation to setting up such a works on Lochtayside. Whatever the origins of this proposal, by 1850 this company had reached the point of setting out their side of the bargain. They needed to be close to a stream with sufficient force to power a small water wheel which was needed to operate a cross cutting saw, and for this reason a site at Finlarig was preferred to the alternative site offered at Ardtalnaig. They also wanted a 19-20 year lease, which rather concerned Wyllie. In return, they offered eight shillings per ton for a supply of a wide range of hardwoods, including thorns, and they would undertake to supply the castle with charcoal.

A letter written in the same year from Wyllie to Campbell of Barcaldine, discusses this proposal, and it becomes clear that Wyllie was not particularly concerned about the length of the lease, because of the supply of wood required over this period. The company had stated that they would require 2,000 tons of wood per year, but Dewar the woodkeeper had estimated that only 1,500 tons per year for seven-eight years could be achieved, at least "supposing we thinned for improvement along with the coppice cuttings". Despite the clear potential for exhausting the woods, Wyllie concluded that if they could achieve fair terms with the company, then it was an enterprise worth undertaking. The lack of any further reference to this enterprise, however, seems to indicate that the offer was not in the end taken up.

By the 1850s the 5th Earl had laid out considerable sums of money on attempts to develop mining on his estates. At Tomnadason, between 1838 and 1850, £4,267 had been spent on copper mining operations, with a return of apparently only £181 for copper ore sold to Swansea (Bainbridge 1981, 42). This process alone would not have utilised large quantities of timber, except for construction purposes, but not content with the poor returns from the mining operations, two further outbursts of industrial activity took place which may have required considerable amounts of timber.

The first of these was the production of sulphuric acid from iron pyrites which had been stockpiled at Firbush Point on the south side of the loch, as a by-product of the mining operations (ibid., 43). Production commenced around 1857, under the auspices of the Loch Tay Mineral and Chemical Company, based on the shore below the mines at Tomnadason. These works, which continued until 1861, would undoubtedly have required a fuel supply for the burners, and it is quite likely that the coppice woods of the surrounding district provided this supply.

A second associated industrial venture was an attempt at actually smelting the copper ore that had been mined to produce copper (ibid., 44-5). This process was complicated and required the employment of two Welshmen. After a number of setbacks, the smelting operation began in April 1860, but the furnace failed to release the metal from its ore, instead producing an 'enriched' ore called regulus (some of which can still be found on the shore at Tomnadason). Such an operation required considerable quantities of fuel, not least because the process required relatively high temperatures in order to extract the metal from its compound (per. comm. A Drever). Smelting ceased in October 1861 for want of ore, which continuing mining operations failed to provide. The end of Lochtayside's industrial 'era' came with the death of the 5th Earl in 1862.

While there is no indication that the fuel source for these industrial processes came from the surrounding woods, it must be assumed that this was the case, since at that time, it was the cheapest source of fuel in that locality. There was no sign that the woods, during the time of this mining activity, were being maintained under the same rigorous management regime that had been developed in the early part of the century. This is somewhat surprising, because it would be expected that such a system would be required if the mining concerns were to be sustainable in the long term. It is probably therefore fortunate for the woods of Lochtayside that these ventures were unsuccessful given the requirements for timber. This attempt at utilisation of the woods must surely be regarded as one of the most exploitative for the whole period from 1650, which seems to have been driven by

one man's obsession. It is entirely possible that this final attempt at wringing profit from Lochtayside's natural woods was a key factor in the extent and condition of the semi-natural woodlands as depicted by the 1861 OS map.

Summary

The semi-natural woodlands of Lochtayside were under management of some form or another since before 1650. Commercial utilisation, however, did not begin in earnest until the mid-18th century, although trade, particularly in pine timber, developed at an earlier period. During the period from 1650 to 1850, the Breadalbane family's Argyll woodland resources were generally more valuable, and appear to have taken precedence over the development of the Lochtayside coppices. Towards the late 18th century, despite the disadvantages of lack of proximity to markets, a more rigorous system of management was adopted for the Lochtayside coppices, and bark at least provided commercial returns. However, by the early 19th century, there was a shift away from largely utilising the existing coppice woods, to a policy of enrichment planting with exotic trees, and to softwood production based on plantations. With the maturation of the extensive larch woods on Lochtayside, the Breadalbane family's Perthshire woods began to assume more economic significance, in comparison the their Argyll woodlands. With the decline in the bark grade after 1815, the principal commercial market for Lochtayside coppices was severely curtailed, although bark production continued, supplemented by spokewood and other timber sales. The last attempt during this period, at utilisation of the woods, was short-lived, which for the woods at least was perhaps fortuitous, since there appears not to have been a resumption of rigorous coppice management at this time.

Of course, the woods were then being put to other uses, not least for game management. This gave rise to a wish to have less disturbed woods in the 19th century, including the cessation of timber operations in some woods. Other woods, as already discussed, were valued for pasture, which must to have led to the development of a quite different type of woodland, both structurally and floristically. It is therefore clear that the woods currently existing on Lochtayside are the result of a complex set interrelated factors based on the development of both commercial and non-commercial use.

CONCLUSION

The primary aim of this thesis has been to examine the utilisation and management of the semi-natural woodland of the highland Perthshire district of Lochtayside, during the period 1650 to 1850. This has involved, in particular, an exploration of the commercial and non-commercial uses of woodland; the changing form of that use; the type of treatment applied to the woodlands; and the overall effects of these interrelating processes of utilisation. This was largely achieved by utilising a combination of sources, in particular the cartographic and documentary evidence from the period, which together are mutually supportive, enabling a reasonably good picture of the course of development to be determined.

Documentary-based research requires an in-depth analysis of the primary and secondary sources. If the agents of change in woodland history are to be fully understood, then their imprints on history must be carefully interpreted. For a documentary-based examination of woodland history, it is therefore essential to be aware of the nature of such documents, and the problems which might be encountered when interpreting them. After all, none of these documents were produced with the 20th century academic researcher in mind.

Estate papers may help to clarify the relationship between the condition of woodland and the factors affecting it over time, but they can rarely, if ever, provide a clear picture of the estate and/or woodland management process. They can be highly fragmentary, incomplete, and often confusing to the documentary-based historian. In the Breadalbane records, for example, few 17th century papers relate specifically to woodland, whereas progressively, from the mid-18th century onwards, coinciding with the era of agricultural improvement, the keeping of records became more systematic, and the problem becomes one of targeting. A description of the woodland history of 17th century Breadalbane was therefore necessarily brief, whereas by the early 19th century, the level of information available and the apparent increase in forestry activity as a whole, requires careful editing of the story.

The lack of wood contracts must remain one of the most elusive and disappointing aspect of the Breadalbane estate papers relating to Lochtayside. Without these, it was difficult to attempt any quantification of woodland utilisation, or to be completely sure of the effectiveness of the woodland management system that was adopted. Further delving may bring these papers to light, but it is probably the case that they do not exist, and indeed never did exist, at least not in the form of the Argyll wood contracts. This seems to point to non-commercial woodland utilisation being relatively more important on Lochtayside than in other parts of Perthshire, and therefore tends to support the pattern of regional differentiation developed by Lindsay (1974, 462).

One form of documentary evidence of great potential value in any woodland history study is the cartographic record of the extent and distribution of woodland in the area at different times. The examination of the record that exists for Lochtayside has been regarded a key element of this study. While the value of maps and plans was viewed as being important in the provision of a visual context for the examination of the utilisation and management of the woodlands, it was also felt that, in the past, the depiction of woodland on historical maps had not been adequately assessed for their accuracy and consistency. It must therefore be concluded, that while there remains many pitfalls associated with relying on the cartographic record as a source for depicting the spatial and temporal patterning of woodland, nevertheless, it should be regarded as a key source for woodland history. That apart, if any study fails to acknowledge sufficiently the limitations of the map or plan being utilised for identifying woodland extent and location, at more than a general level, then serious doubt must be cast upon the conclusions reached by that work.

It is clear that much can be learned about the history of a district, and its woodlands, from the combined evidence of published commentaries, written estate record and cartographic representation. If critically evaluated, such sources can greatly enhance the understanding of the past nature of the Scottish landscape. The picture of the woodland history of Lochtayside that has emerged from an examination of these sources is fascinating, if incomplete. Indeed, one could never expect to achieve a complete picture.

It may be suggested, that there is still much to learn, not only about the woodlands themselves, but also about the form of utilisation, and about those people that used them. The following paragraphs can only therefore be regarded as a form of interim report on the history of the utilisation and management of the semi-natural woodlands of Lochtayside, based on the findings of Chapters One and Three.

The Campbells of Glenorchy appear to have been aware of the kind of regulations which would help to preserve their woods from at least the 16th century. This awareness may not be regarded as particularly unusual, even in the Highlands, but it serves to remind us that Highland landowners, like the Earls of Breadalbane, were not ignorant of the requirements of woodland conservation, and the principles of woodland management. Consequently, whether such conservation methods were adopted or not, was very much dependant on the individual character of each Earl, and also on the wider social, economic and political influences of the time.

It has been argued that landowners only look care of their woods, if there was the possibility of financial gain (Lindsay 1974, 84). To an extent this is probably true, however, the value attached to a wood was often more complicated than the simple monetary gain for the landowner. He had to balance up the needs of tenantry, and the rental income of his land, against the cost of woodland management, and the income it was likely to accrue. To an extent this was very speculative, particularly given the coppice crop rotations likely to be involved. There is little doubt that then, as now, the quality of woodland and indeed all land management, varied over time, and that the individual character of the various Earls, who had to wrestle with the cost analysis, played a significant part in that variation.

However, while the decision-making process was doubtless influenced by the character and background of the individuals involved, the wider social, political and particularly economic circumstances must be regarded as underpinning the process of evolution of woodland utilisation. Thus, for example, in the early 18th century economic hardship brought about by, at least partly, the 1st Earl's involvement in political intrigue, may have precipitated the opening up of

Breadalbane's Argyll woodlands to commercial exploitation. The consequences of the 2nd Earl's experiences with the 'Irish' may therefore have influenced the development of a systematic coppice regime on Lochtayside from as early as the mid-18th century.

Of course economic factors can rarely be excluded from the equation, and without market demand for the produce, such a system might have been regarded as mere whimsy. Equally, the value of land under trees must always be seen in the context of alternative land use. There can be no doubt that considerable pressure was placed on Lochtayside's woods by the needs of the local population, both for woodland produce, but particularly for the woodland area. This in turn was heavily influenced by political, social and economic factors such as a war, population pressure and the emergence of capitalism.

It is evident from an examination of the non-commercial utilisation of woodland produce, and its area, that this use was prodigious. Every aspect of the traditional life on Lochtayside had some requirement for woodland produce, and if it was restricted then it would be illegally procured. By the same token, the use of the woodland area in an essentially pastoral society was also essential, so much so that the population risked potentially severe penalties to gain access to the grazing in woodland. Together these uses had considerable significance in affecting the woodlands of Lochtayside, although the evidence does not allow for a full understanding of the importance of the individual factors, nor how they influenced each other. These non-commercial influences were constantly changing, often in response to the changing face of the socio-economic system, so while cattle and goats had a significant effect on the woodlands during the 17th and 18th centuries, by the 19th century, sheep and game played a more important role in the treatment of the woodland area.

Neither was the commercial utilisation of the woodlands on Lochtayside static. As the demand for the produce of oak coppice increased in the late 18th century, so too did the management of the woodlands which became more proactive and interventionist. Thus brush or 'barren' species were less desirable and removed, and 'vacancies' were planted with oak, in a form of enrichment planting. This was

probably the first sustained attempt at changing the composition of these woods in their history. During the 19th century, the emphasis began to shift from the 'natural' woods to plantation forestry, with larch replacing pine as the favoured tree. Coppice woodland became less important to the estate, although it was still utilised, at least until the 1860's. At this stage, the use of the woodland area for both livestock and game assumed more importance which again shifted the emphasis of the management employed in these area. In some cases it is possible that this permitted the decline of coppice management, and the eventual neglect of the woodland, although there is no firm evidence for this.

It would be appropriate to regard this study as a scoping exercise, largely based on estate records, which was able to demonstrate the enormous potential, not only for future detailed work on woodland utilisation, and for other related subjects such as plantation forestry, seed sources and nurseries, and within a wider geographical area of Perthshire, but also for more extensive study of other aspects of the historical geography of Highland Perthshire. There is also scope to extend the period of study back to the 16th and early 17th centuries, as well as up to the early 20th century. An important aspect of woodland history which remains to be examined in detail in Scotland, is the link between past management history and the current ecological status of woodlands.

Other possible valuable subject areas for woodland historians lie in the more specialised fields of palynology, place names and oral history. It was a great source of frustration that the voice of the tenantry was rarely heard through the estate records. Others have used the Baron Court Records to try to discern that voice, and the Breadalbane records still hold great potential for future work on their court records (Smout & Watson 1995; 1996). The lands of Lochtayside and hills of Breadalbane are steeped in the Gaelic tradition. In many ways it is fortunate that Duncan Ban MacIntyre, the 18th century Gaelic poet, spent much of his working life on the Breadalbane estates. His poems are a valuable source for landscape and wildlife descriptions. It is, however, only fleetingly to be lamented by the woodland historian that he was a gamekeeper/forester with an intimate knowledge of the Breadalbane hills and wildlife, rather than a woodkeeper of the valley and loch side.

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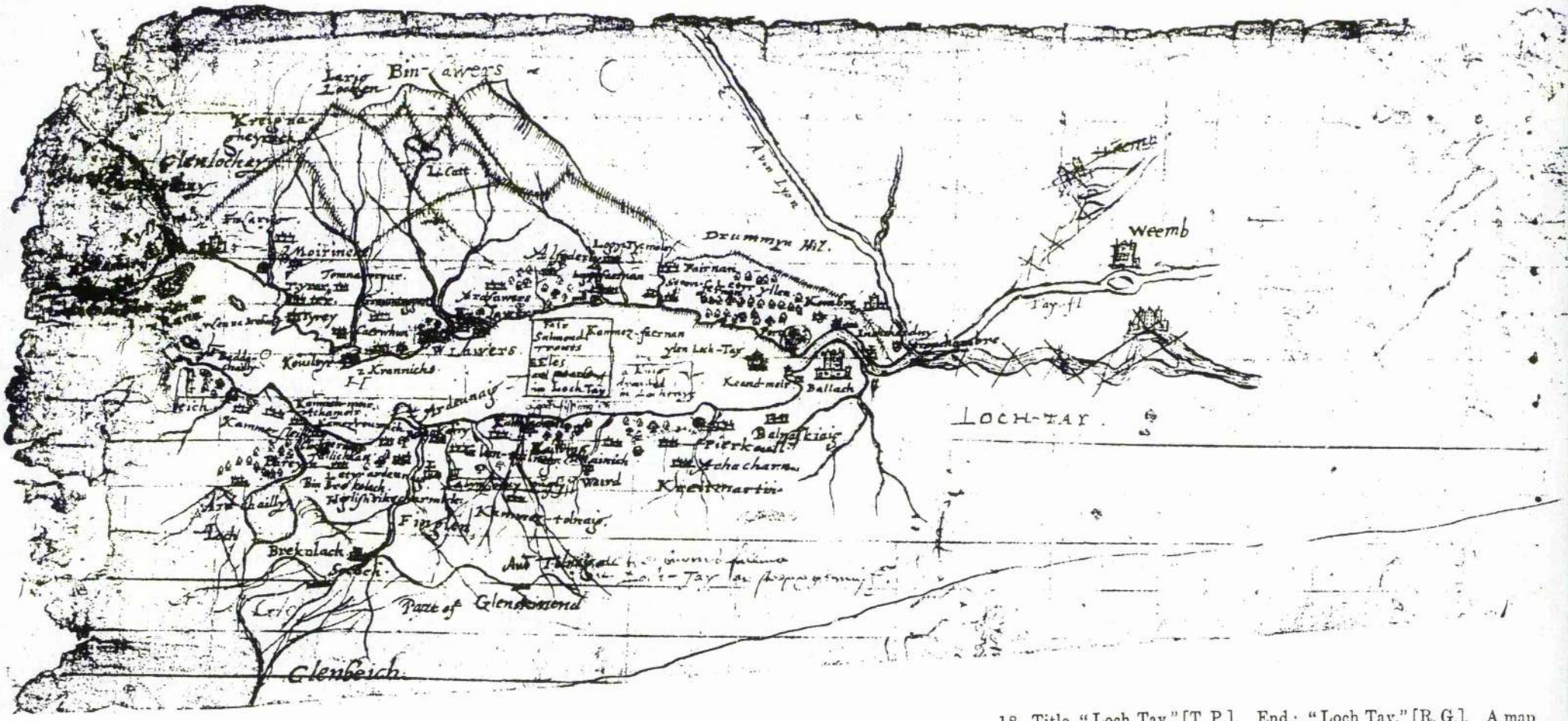
Figure 9 **Loch Tay looking west to Killin and Ben More, showing the woods of Crannich on the right bank, and the woods of Camuscurich and Firbush on the left bank. (Photo: M Stewart)**

Figure 10 Taymouth Castle looking north from the Fort Brae

Figure 11 Ardtalnaig, looking north east towards Fearnan

(Photos: M Stewart)



18. Title, "Loch Tay." [T. P.]. End: "Loch Tay." [R. G.]. A map of Loch Tay and the beginning of the River Tay. Near "Weemb" the river has been drawn three times, two of the drawings being cancelled. The work is fairly neat print and script, some of it done over. The sheet is ruled in squares of about $\frac{1}{3}$ inch sides. This map and No. 7 were drawn on the same sheet, and cut apart. (1) $5\frac{1}{4} \times 12$. (2) $4\frac{3}{4} \times 11\frac{3}{4}$. (3) ——. (4) c. $2\frac{1}{2}$.

Figure 4: The Pont Map of Lochtayside
Source: National Library for Scotland

Figure 5: The Roy Map of Lochtayside, Protracted Copy
Source: The British Library

Figure 6: The Roy Map of Lochtayside, the Fair Copy
Source: The British Library

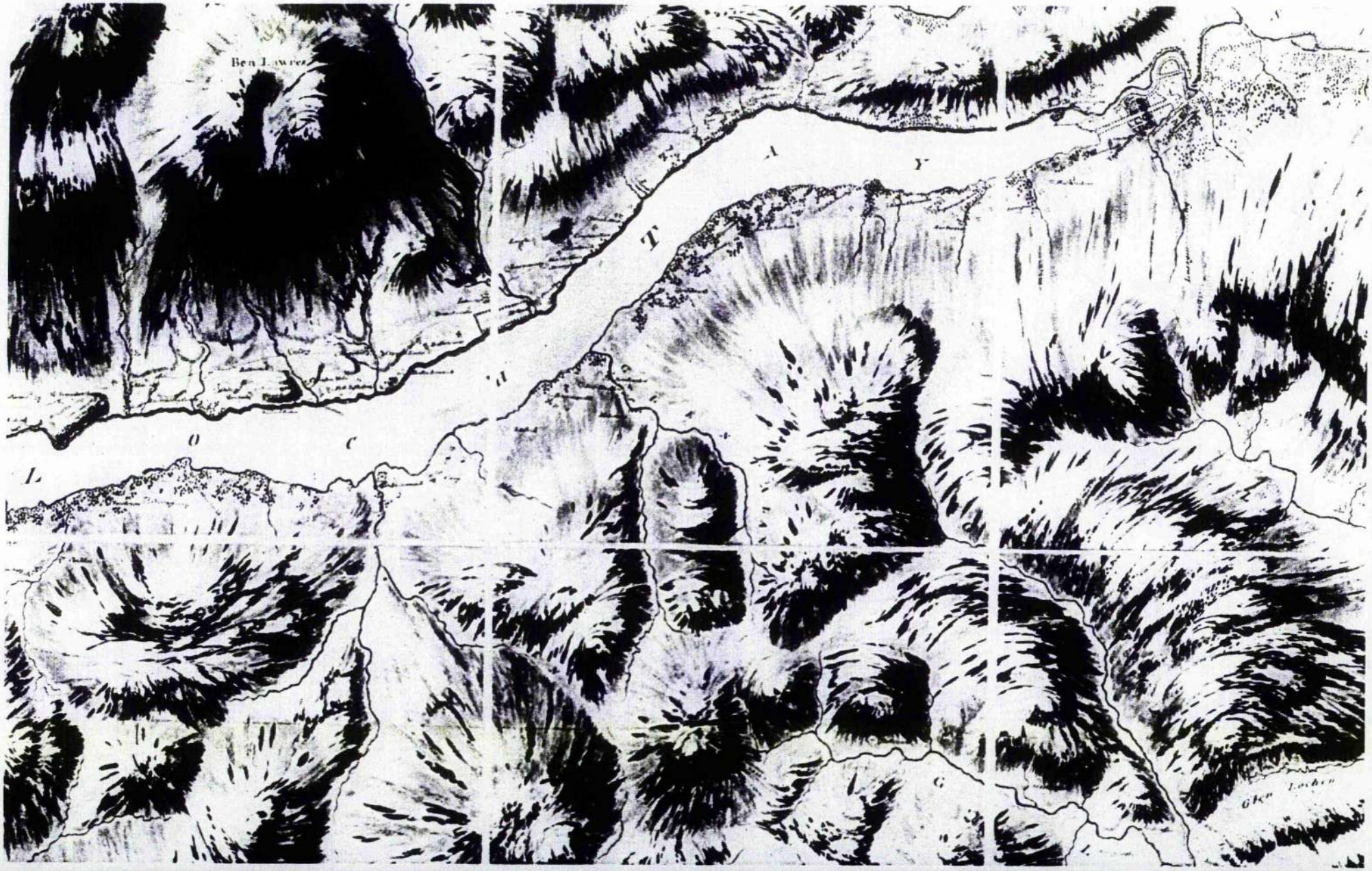
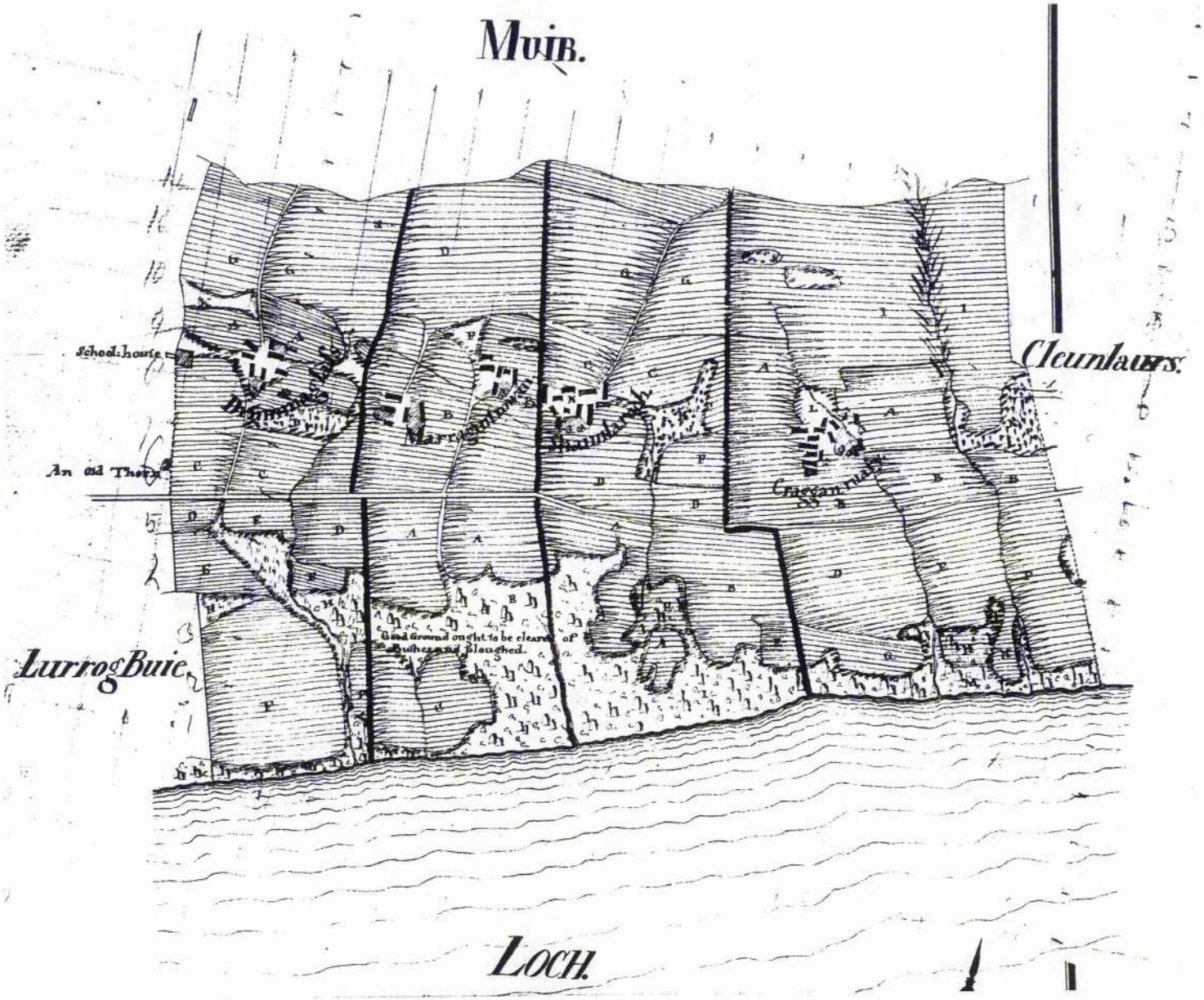
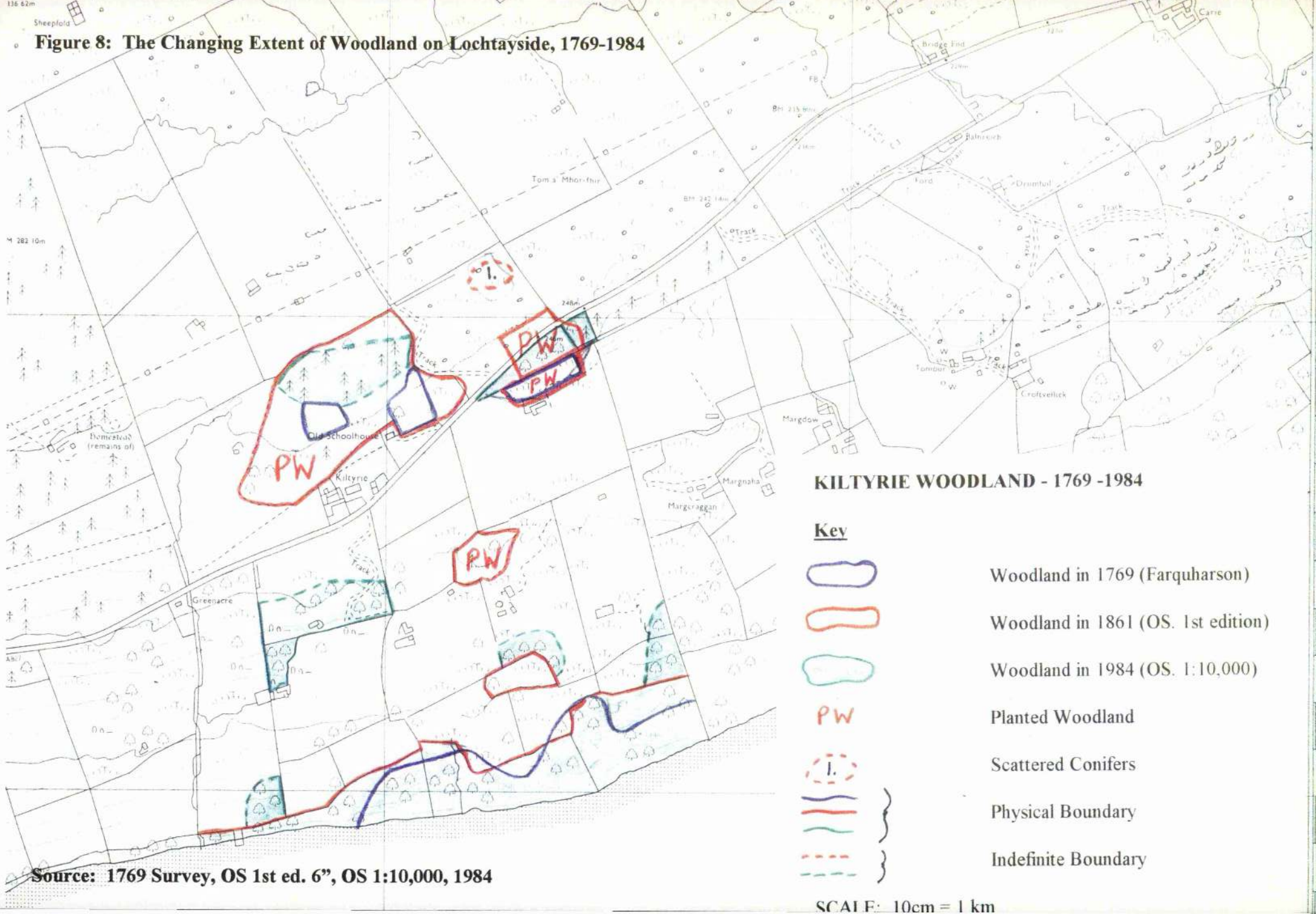


Figure 7: The Survey of Lochtayside 1769, Lurgbuie to Cleulawers, north side of Loch Tay



Source: SRO West Register House, RHP 972/1-2

Figure 8: The Changing Extent of Woodland on Lochtayside, 1769-1984



Source: 1769 Survey, OS 1st ed. 6", OS 1:10,000, 1984